

حمل الآن

مجاناً وحصرياً

المراجعة رقم (1)

اختبار شهر مارس



15
Marks

1 is a salt that dissolves in water and has a blue color.

2 The measuring unit of speed is, while work is measured in

- 1 The mass of an object is doubled (relative to its potential energy).
- 2 The distance that is covered by a moving object is doubled, while the time remains constant.
(relative to the speed)

1 The mechanical energy of a freely falling object equals at the moment it reaches the ground.

- a) its potential energy
- b) zero
- c) its kinetic energy
- d) the weight of the object
- Which of the following feeding relationships harms one of the two living organisms?
- a) Predation and competition.
- b) Mutualism and commensalism.
- c) Mutualism and predation.
- d) Predation and commensalism.

1 The mechanical energy of an object remains constant during its falling, although its potential energy decreases.

- 2 There is no work done when a person carrying a bag while walking horizontally.

P.O.C	Potential energy	Kinetic energy
The affecting factors	<p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p>

Model (2)

15
Marks

1 A) Put (✓) or (X):

- 1 The chemical formula of copper sulfate is CuSO_4 , and its color is green. ()
- 2 When a moving object returns to its starting point, its displacement is zero. ()

B) 1- Write the chemical formula for the following salts that consists of:

- 1 PO_4^{3-} , K^+ :
- 2 SO_4^{2-} , Al^{3+} :

2- Write the type of nutritional relationship between polar bear and seal:

.....

2 A) Write the scientific term:

- 1 The total length covered by a moving object from the starting point to the endpoint. (.....)
- 2 The amount of energy required to move an object a certain displacement in the same direction of the applied force. (.....)

B) 1- When do the following become equal?

- 1 Distance and displacement.
- 2 Potential energy and kinetic energy of a falling object.

2- Calculate the potential energy of a metallic ball with a mass of 2 kg falling from a height of 5 m, given that the gravitational field strength is 10 N/kg.

.....

Model (3)

15
Marks

1 A) Correct the underlined words:

- 1 When the speed of a moving object doubles, its kinetic energy increases to double.

(.....)

- 2 Ammonium chloride solution turns the universal indicator into blue.

(.....)

B) 1- What is meant by...?

- 1 The speed of an object = 100 m/s.

.....

- 2 The Mechanical energy of an object = 200 J.

.....

2- Compare between scavengers and omnivores according to the way of feeding:

P.O.C	Scavengers	Decomposers
The way of feeding

2 A) Complete the following sentences:

- 1 Food chains start with and end with

- 2 When an object is thrown upward, its potential energy and its kinetic energy

B) 1- What happens when ...?

- 1 The mass of an object increases to double and its speed decreases to half.

“relative to the kinetic energy”

.....

- 2 When a moving object returns back to its starting point.

.....

2- Calculate the height of an object with a mass of 6 kg above the ground when its potential energy is 180 J (given that the gravitational field strength is 10 N/kg).

.....

15
Marks

- 1 Ionic compounds produced from the reaction between acids and alkalis. (.....)
- 2 A group of food chains interconnected with each other in the ecosystem. (.....)

B) 1- Mention an example for each of the following:

- 1 Herbivores animals:
- 2 A salt that doesn't dissolve in water:

2- Calculate the time required for a car moving at a speed of 40 m/s to cover a distance of 200 m.

2 A) Choose the correct answer:

- 1** When a ball is thrown upward, its
- a) kinetic energy increases b) potential energy decreases
c) speed increases d) mechanical energy remains constant
- 2** The kinetic energy of an object with a mass of 5 kg moving at a speed of 2 m/s is
- a) 10 J b) 20 J c) 200 J d) 40 J

B) 1- Give a reason for:

- 1** The kinetic energy of an object at its maximum height is zero.

- 2** The potential energy of an object decreases as it falls downward.

2- A body with a mass of 600 g is thrown vertically upward with a speed of 20 m/s. Calculate its mechanical energy at the maximum height.

Model (5)

15
Marks

1 A) Correct the underlined words:

- 1 Only 1% of the energy is transferred from organisms at one trophic level to organisms at the next level. (.....)
- 2 The pH value of Na_2CO_3 solution is less than 7. (.....)

B) 1- What is the importance of ...?

- 1 Bacteria and algae in ecosystem:

.....

.....

- 2 High dam:

.....



2- Look at the opposite figure, then answer:

- The given diagram shows the motion of a pendulum with a mass of 1 kg, and its kinetic energy at the rest position is 32 J. Calculate its speed at the rest point.

.....

.....

.....

2 A) Put (✓) or (X):

- 1 Mutualism is the nutritional relationship between bees and flowers. ()
- 2 The work done by a force perpendicular to the direction of an object's motion is maximum. ()

B) 1- What is meant by ...?

- 1 The kinetic energy of an object is 20 J.

.....

- 2 The displacement of an object is 100 m.

.....

.....

2- What is the number that indicates the weight of an object with a potential energy of 88 J at height of 11m?

.....

Model (1)

15
Marks

1 A) Complete the following sentences:

- 1 **Copper sulphate** is a salt that dissolves in water and has a blue color.
- 2 The measuring unit of speed is **meter/second**, while work is measured in **Joule**

B) 1- What happens when ...?

- 1 The mass of an object is doubled (relative to its potential energy).
- **Its potential energy will be doubled.**
- 2 The distance that is covered by a moving object is doubled, while the time remains constant.
(relative to the speed)
- **The speed will be double.**

2- Calculate the kinetic energy of an object with a mass of 12 kg moving at a speed of 2 m/s.

$$KE = \frac{1}{2}mv^2 = \frac{1}{2} \times 12 \times 2 \times 2 = 24j$$

2 A) Choose the correct answer:

- 1 The mechanical energy of a freely falling object equals at the moment it reaches the ground.
a) its potential energy
b) zero
c) **its kinetic energy**
d) the weight of the object
- 2 Which of the following feeding relationships harms one of the two living organisms?
a) **Predation and competition.**
b) Mutualism and commensalism.
c) Mutualism and predation.
d) Predation and commensalism.

B) 1- Give a reason:

- 1 The mechanical energy of an object remains constant during its falling, although its potential energy decreases.
- **Because the decrease in potential energy is equal to the increase in kinetic energy.**
- 2 There is no work done when a person carrying a bag while walking horizontally.
- **Because the force applied is perpendicular to the direction of the bag's motion.**

2- Compare between potential energy and kinetic energy according to the factors affecting on them:

P.O.C	Potential energy	Kinetic energy
The affecting factors	-The weight of an object (w) -The height of an object away from the ground (h)	- The mass of an object (m) - The speed of an object (v)

Model (2)

15
Marks

1 A) Put (✓) or (X):

- 1 The chemical formula of copper sulfate is CuSO_4 , and its color is green. (X)
- 2 When a moving object returns to its starting point, its displacement is zero. (✓)

B) 1- Write the chemical formula for the following salts that consists of:

- 1 PO_4^{3-} , K^+ : K_3PO_4
- 2 SO_4^{2-} , Al^{3+} : $\text{Al}_2(\text{SO}_4)_3$

2- Write the type of nutritional relationship between polar bear and seal:

- Predation relationship.

2 A) Write the scientific term:

- 1 The total length covered by a moving object from the starting point to the endpoint. (Distance)
- 2 The amount of energy required to move an object a certain displacement in the same direction of the applied force. (Work)

B) 1- When do the following become equal?

- 1 Distance and displacement.
- When the object moves in a straight line and in a constant direction.
- 2 Potential energy and kinetic energy of a falling object.
- When the object is at half of its initial height from the ground.

2- Calculate the potential energy of a metallic ball with a mass of 2 kg falling from a height of 5 m, given that the gravitational field strength is 10 N/kg.

- $\text{PE} = mgh = 2 \times 10 \times 5 = 50 \text{ J}$.

Model (3)

15
Marks

1 A) Correct the underlined words:

- 1 When the speed of a moving object doubles, its kinetic energy increases to double. (**four times**)
- 2 Ammonium chloride solution turns the universal indicator into blue. (**red**)

B) 1- What is meant by...?

- 1 The speed of an object = 100 m/s.
- It means that this object covered a distance = 100 m in one second.
- 2 The Mechanical energy of an object = 200 J.
- It means the sum of potential energy and kinetic energy is 20 J.

2- Compare between scavengers and omnivores according to the way of feeding:

P.O.C	Scavengers	Decomposers
The way of feeding	They feed on the remains of dead bodies.	They feed on both plants and animals.

2 A) Complete the following sentences:

- 1 Food chains start with **producers** and end with **decomposers**.
- 2 When an object is thrown upward, its potential energy **increases** and its kinetic energy **decreases**.

B) 1- What happens when ...?

- 1 The mass of an object increases to double and its speed decreases to half.
"relative to the kinetic energy"

- The kinetic energy decreases to a quarter.

- 2 When a moving object returns back to its starting point.

- Its displacement becomes zero.

2- Calculate the height of an object with a mass of 6 kg above the ground when its potential energy is 180 J (given that the gravitational field strength is 10 N/kg).

$$h = \frac{PE}{mg} = \frac{180}{6 \times 10} = 3 \text{ m}$$

15
Marks

- 1 Ionic compounds produced from the reaction between acids and alkalis. (**Salts**)
- 2 A group of food chains interconnected with each other in the ecosystem. (**Food web**)

B) 1- Mention an example for each of the following:

- 1 Herbivores animals: **Cows**.
- 2 A salt that doesn't dissolve in water: **Silver chloride**.

2- Calculate the time required for a car moving at a speed of 40 m/s to cover a distance of 200 m.

$$t = \frac{d}{v} = \frac{200}{40} = 5 \text{ sec}$$

2 A) Choose the correct answer:

- 1** When a ball is thrown upward, its
- a) kinetic energy increases b) potential energy decreases
c) speed increases d) mechanical energy remains constant
- 2** The kinetic energy of an object with a mass of 5 kg moving at a speed of 2 m/s is
- a) 10 J b) 20 J c) 200 J d) 40 J

B) 1- Give a reason for:

- 1 The kinetic energy of an object at its maximum height is zero.
- **Because at the maximum height, the speed of the object becomes zero.**
- 2 The potential energy of an object decreases as it falls downward.
- **Because the potential energy is inversely proportional to the height above the ground.**

2- A body with a mass of 600 g is thrown vertically upward with a speed of 20 m/s. Calculate its mechanical energy at the maximum height.

$$m_{(kg)} = \frac{600}{1000} = 0.6 \text{ kg}$$

$$ME = KE = \frac{1}{2}mv^2 = \frac{1}{2} \times 0.6 \times (20)^2 = \frac{1}{2} \times 0.6 \times 400 = 120 \text{ J}$$

Model (5)

15
Marks

1 A) Correct the underlined words:

- 1 Only 1% of the energy is transferred from organisms at one trophic level to organisms at the next level. (10%)
- 2 The pH value of Na_2CO_3 solution is less than 7. (greater)

B) 1- What is the importance of ...?

- 1 Bacteria and algae in ecosystem:
- They decompose organic materials in the bodies of dead organisms breaks them down into simple substances that mix with the soil.
- 2 High dam:
- Changing the kinetic energy of water into electric energy.



2- Look at the opposite figure, then answer:

- The given diagram shows the motion of a pendulum with a mass of 1 kg, and its kinetic energy at the rest position is 32 J. Calculate its speed at the rest point.

$$v^2 = \frac{2KE}{m} = \frac{2 \times 32}{1}$$

$$= 64 \text{ m/s}$$

$$v = \sqrt{64} = 8 \text{ m/s}$$

2 A) Put (✓) or (X):

- 1 Mutualism is the nutritional relationship between bees and flowers. (✓)
- 2 The work done by a force perpendicular to the direction of an object's motion is maximum. (X)

B) 1- What is meant by ...?

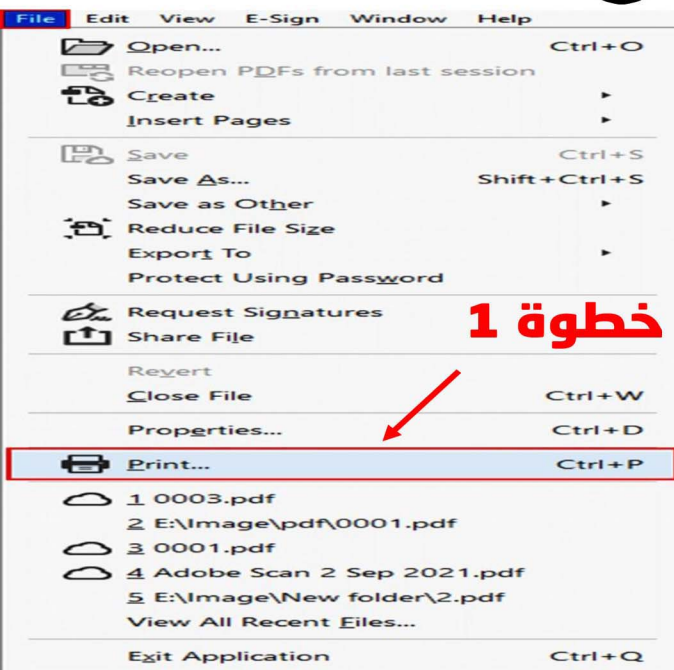
- 1 The kinetic energy of an object is 20 J.
- It means the energy gained by the object due to its motion is 20 J.
- 2 The displacement of an object is 100 m.
- It means the shortest straight-line path in a fixed direction between the starting and ending points is 100 m.

2- What is the number that indicates the weight of an object with a potential energy of 88 J at height of 11m?

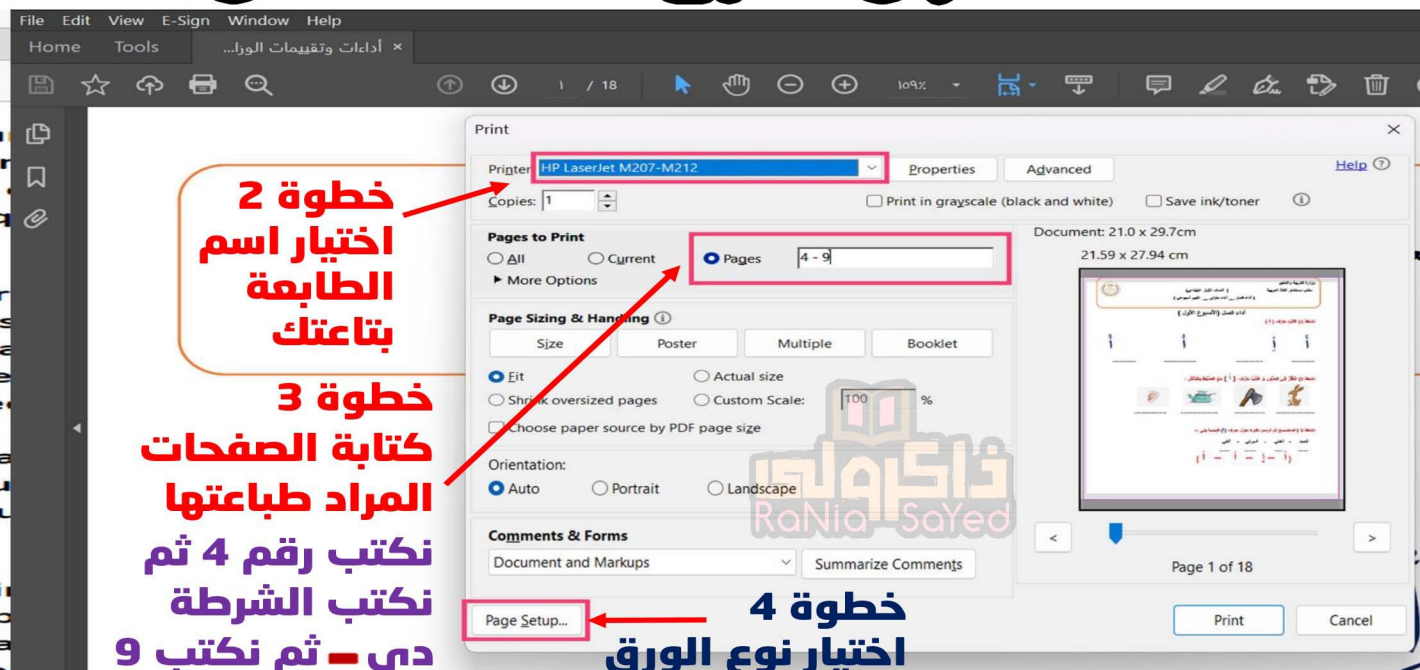
$$W = \frac{PE}{h} = \frac{88}{11} = 8 \text{ N}$$

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



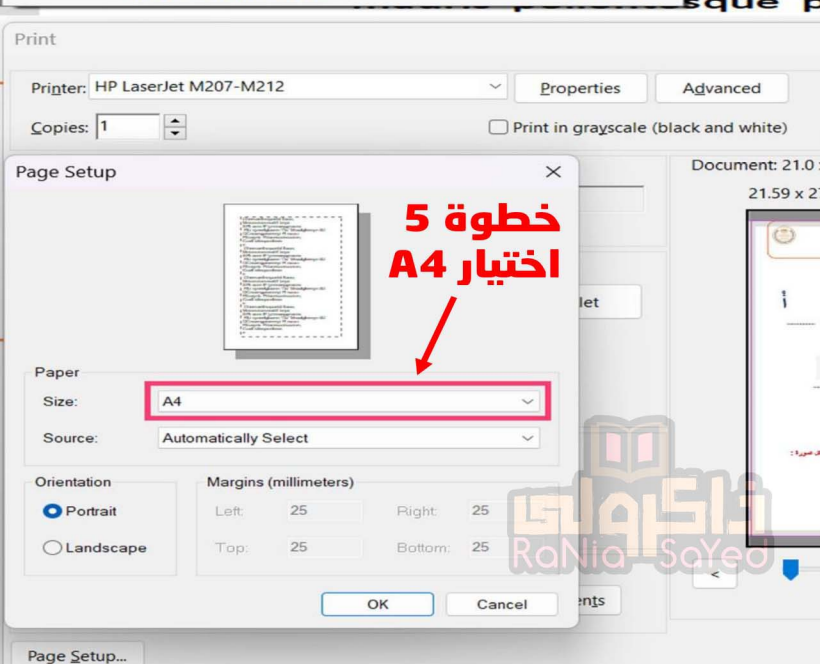
خطوة 1



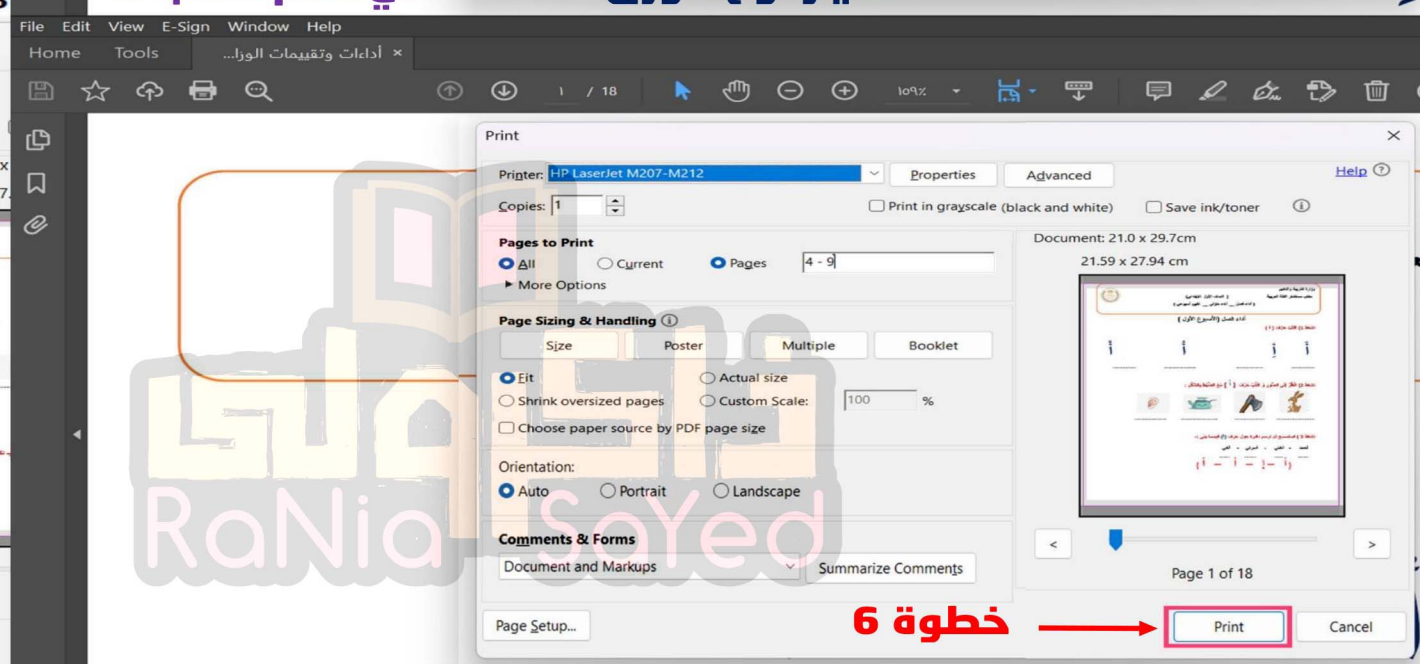
خطوة 2
اختيار اسم
الطابعة
بتاعتك

خطوة 3
كتابة الصفحات
المراد طباعتها
نكتب رقم 4 ثم
نكتب الشرطة
دي - ثم نكتب 9

خطوة 4
اختيار نوع الورق



خطوة 5
اختيار A4



خطوة 6

حمل الآن

مجانا وحصريا

المراجعة رقم (2)

اختبار شهر مارس



1 Definitions:

Path of movement	It is a set of points that an object passes through during its motion.
Distance (d)	It is the total length of any path taken by the object during its motion from the starting point to the end point.
Displacement (s)	It is the shortest straight path connecting between the starting point and the end point in a constant direction.
Speed (v)	It is the distance covered per a unit of time.
Work (W)	It is the amount of energy required to move an object through a certain displacement in the same direction of the force that acts on it.
Controlling variables	It is one of the skills in scientific research and it is used to design scientific comparative experiments.
Independent variable (Cause)	It is the variable that is changed during the experiment.
Dependent variable (Effect)	It is the variable to be tested, which changes in response to changing the independent variable.
Controlled variables	They are the variables that are controlled to remain constant throughout the experiment.
Energy	It is the ability to do work.
Potential energy (PE)	It is the energy stored in an object as a result of the work done on it.
Kinetic energy (KE)	It is the energy gained by an object as a result of its motion. Or It is the work done during the motion of an object.
Mechanical energy (ME)	It is the summation of potential energy and kinetic energy of an object.

2 What is meant by:

1. The distance covered by an object equals 30 m?

It means that the total length of the path taken by the object during its motion from the starting point to the end point equals 20 m.

2. The displacement covered by an object equals 20 m?

It means that the shortest straight path connecting between the starting point and the end point in a constant direction equals 20 m.

3. An object moves at a speed of 80 m/s?

This means that the object covers a distance of 80 m in one second.

4. A car covers a distance of 100 km in two hours?

This means that the car moves at a speed of 50 km/hr.

$$\text{Where, } v = \frac{d}{t} = \frac{100}{2} = 50 \text{ km/hr.}$$

5. The potential energy of an object equals 100 J?

This means that the energy stored in the object as a result of the work done on it equals 100 J.

6. The kinetic energy of an object equals 100 J?

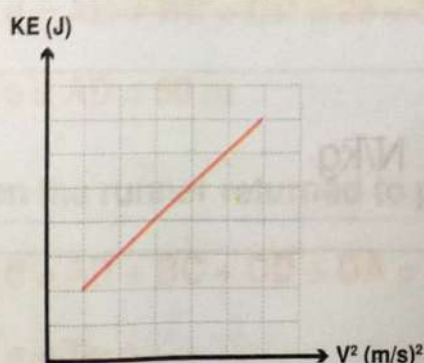
This means that the energy gained by the object as a result of its motion equals 100 J.

7. The mechanical energy of a moving object equals 200 J?

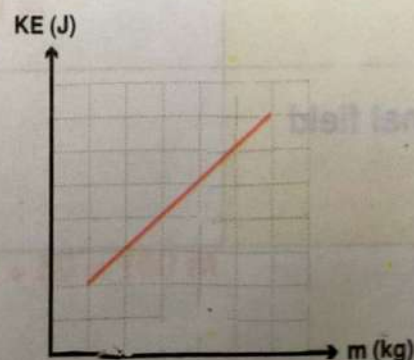
This means that the summation of potential energy and kinetic energy of the object during its motion equals 200 J.

3 Graphs:

At constant mass, the relationship between speed and kinetic energy is direct.



At constant speed, the relationship between mass and kinetic energy is direct.

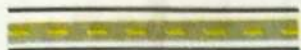


Distance Displacement	<p>Centimeter $\xrightarrow{+100}$ Meter $\xrightarrow{+1000}$ Kilometer cm $\xleftarrow{100 \times}$ m $\xleftarrow{1000 \times}$ km</p>
Time	<p>Second $\xrightarrow{+60}$ Minute $\xrightarrow{+60}$ Hour s $\xleftarrow{60 \times}$ min $\xleftarrow{60 \times}$ hr</p>
Speed	Kilometer/hour (km/h) – Meter/second (m/s)
Work Energy Potential energy Kinetic energy Mechanical energy	<p>Joule $\xrightarrow{+1000}$ Kilojoule J $\xleftarrow{1000 \times}$ kJ</p>
Force Weight	Newton (N)
Mass	<p>Gram $\xrightarrow{+1000}$ Kilogram g $\xleftarrow{1000 \times}$ kg</p>
Gravitational field intensity	N/kg

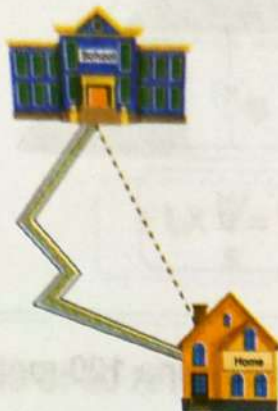
5 Laws and problems:

① Problems of Distance and Displacement

Distance (d):



The total length



Displacement (s):



The shortest straight path

- When an object moves in a straight line in one direction:
Distance = Displacement
- When an object returns to its starting point, the displacement (s) is zero.

The opposite figure represents the path taken by a runner around the playground from the starting point (A) until he returned to the same point.



Calculate the distance (d) and displacement (s) in the following cases:

- ① When the runner reached point (B).

$$d = s = AB = 25 \text{ m}$$

- ② When the runner reached point (D).

$$d = AB + BC + CD = 25 + 50 + 25 = 100 \text{ m}$$

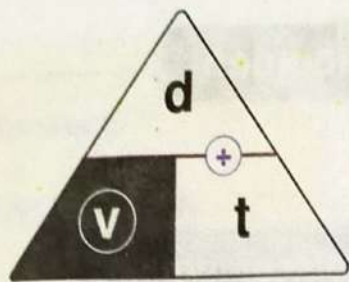
$$s = AD = 50 \text{ m}$$

- ③ When the runner returned to point (A).

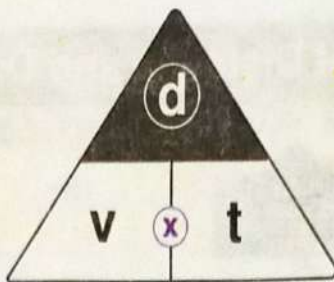
$$d = AB + BC + CD + DA = 25 + 50 + 25 + 50 = 150 \text{ m}$$

$$s = \text{Zero}$$

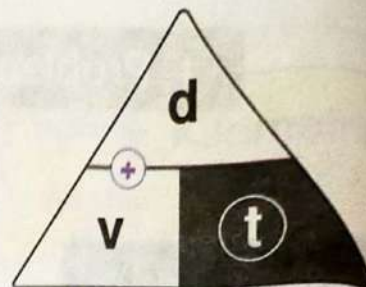
② Problems of Speed



$$v = \frac{d}{t}$$



$$d = v \times t$$



$$t = \frac{d}{v}$$

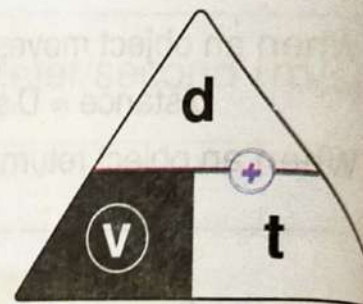
- ① Calculate the speed of a runner who runs 100 meters in 20 seconds.

$$v = ?$$

$$d = 100 \text{ m}$$

$$t = 20 \text{ s}$$

$$v = \frac{d}{t} = \frac{100}{20} = 5 \text{ m/s}$$



- ② Calculate the distance covered by the car, which took 60 minutes to travel at a speed of 60 km/h.

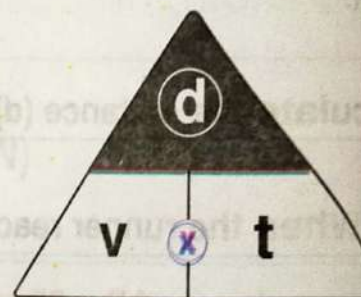
$$v = 60 \text{ km/hr}$$

$$d = ?$$

$$t = 1 \text{ hr}$$

$$t = \frac{60}{60} = 1 \text{ hr}$$

$$d = v \times t = 60 \times 1 = 60 \text{ km}$$



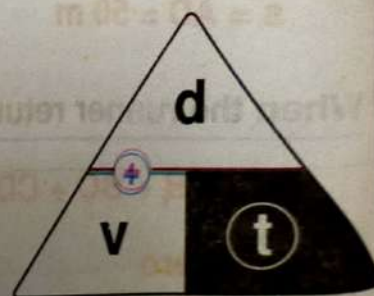
- ③ Calculate the time needed for a train that moves with a speed of 100 km/hr to cover a distance of 200 km.

$$v = 100 \text{ km/h}$$

$$d = 200 \text{ km}$$

$$t = ?$$

$$t = \frac{d}{v} = \frac{200}{100} = 2 \text{ hours}$$



⑥ Problems of Mechanical Energy

Mechanical energy (ME) = Potential energy (PE) + Kinetic energy (KE)

At the highest point:



KE = Zero

ME = PE

At the middle height:



KE = PE = $\frac{1}{2}$ ME

ME = 2 PE = 2 KE

At the ground:



PE = Zero

ME = KE

- ① Calculate the mechanical energy of a moving object if its kinetic energy 300 J and its potential energy is 200 J.

ME = ?

KE = 300 J

PE = 200 J

$$ME = KE + PE = 300 + 200 = 500 \text{ J}$$

- ② A ball of a mass of 5 Kg falls from a height of 8 meters down toward the ground. Find the kinetic energy (KE) and potential energy (PE) in the following cases, given that the gravitational field intensity is 10 N/kg.

a. At the highest point

b. In the middle

c. At the ground

m = 5 kg

h = 8 m

g = 10 N/kg

KE = ?

PE = ?

a. At the highest point:

KE = Zero

$$PE = m g h = 5 \times 10 \times 8 = 400 \text{ J}$$

$$ME = PE = 400 \text{ J}$$

b. In the middle:

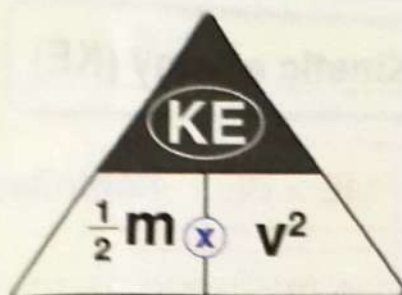
$$PE = KE = \frac{ME}{2} = \frac{400}{2} = 200 \text{ J}$$

c. At the ground:

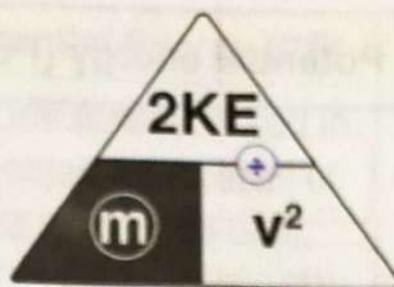
PE = Zero

$$KE = ME = 400 \text{ J}$$

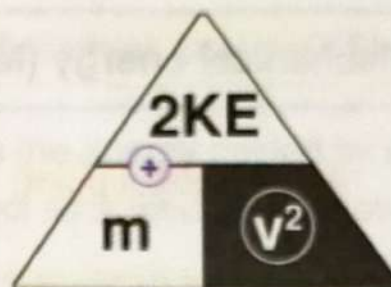
Problems of Kinetic Energy



$$KE = \frac{1}{2} \times m \times v^2$$



$$m = \frac{2KE}{v^2}$$



$$v^2 = \frac{2KE}{m}$$

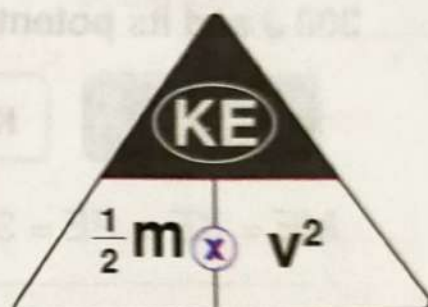
- ① Calculate the kinetic energy of a 2 kg metal ball moving at a speed of 3 m/s.

$$KE = ?$$

$$m = 2 \text{ kg}$$

$$v = 3 \text{ m/s}$$

$$KE = \frac{1}{2} \times m \times v^2 = \frac{1}{2} \times 2 \times (3)^2 = 9 \text{ J}$$



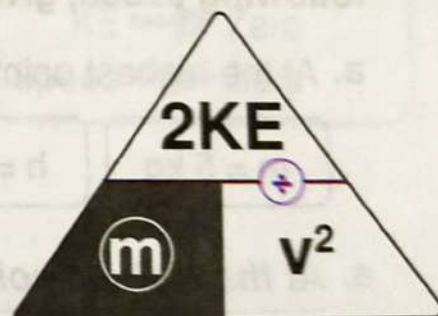
- ② Calculate the mass of an object with a kinetic energy of 50 J and a speed of 5 m/s.

$$KE = 50 \text{ J}$$

$$m = ?$$

$$v = 5 \text{ m/s}$$

$$m = \frac{2KE}{v^2} = \frac{2 \times 50}{5^2} = 4 \text{ kg}$$



- ③ Calculate the speed of an object with a kinetic energy of 16 J and a mass of 2 kg.

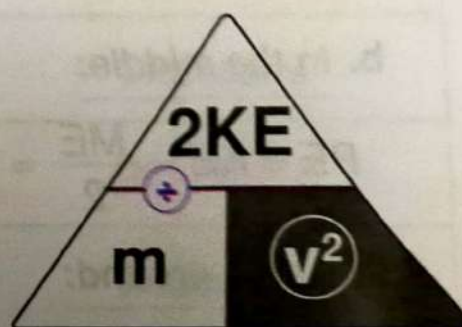
$$KE = 16 \text{ J}$$

$$m = 2 \text{ kg}$$

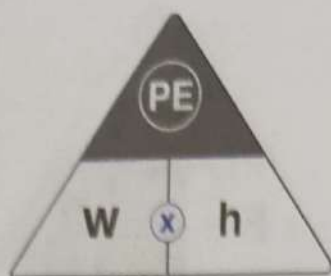
$$v = ?$$

$$v^2 = \frac{2KE}{m} = \frac{2 \times 16}{2} = 16 \text{ (m/s)}^2$$

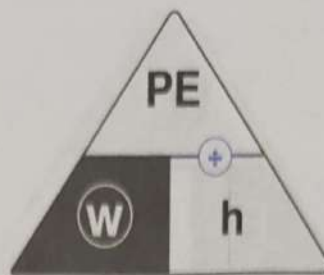
$$v = \sqrt{16} = 4 \text{ m/s}$$



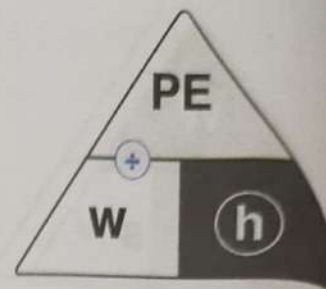
④ Problems of Potential Energy



$$PE = W \times h$$



$$w = \frac{PE}{h}$$



$$h = \frac{PE}{w}$$

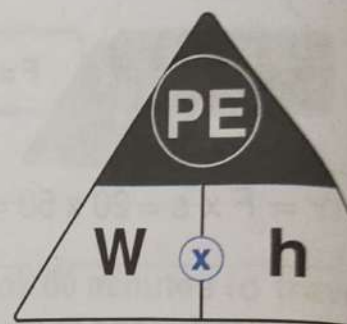
- ① Calculate the potential energy of an object whose weight is 60 N and its height from the Earth's surface is two meters.

$$PE = ?$$

$$W = 60 \text{ N}$$

$$h = 2 \text{ m}$$

$$PE = W \times h = 60 \times 2 = 120 \text{ J}$$



- ② A work of 150 kJ is done to lift an object with a mass of 50 kg from the ground level to a height (h) above the ground. Given that the gravitation field intensity is 10 N/kg and 1 kJ = 1000 J, calculate the height.

$$PE = 150 \text{ KJ}$$

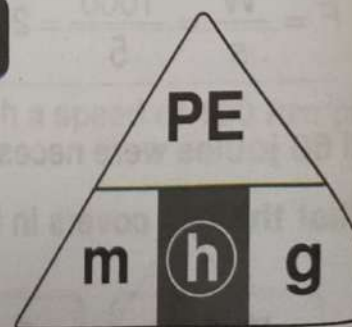
$$m = 50 \text{ kg}$$

$$g = 10 \text{ N/kg}$$

$$h = ?$$

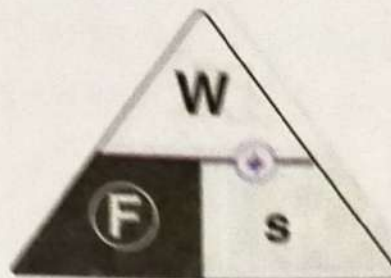
$$PE = 150 \times 1000 = 150000 \text{ J}$$

$$h = \frac{PE}{m \times g} = \frac{150000}{50 \times 10} = 300 \text{ m}$$





$$W = F \times s$$



$$F = \frac{W}{s}$$



$$s = \frac{W}{F}$$

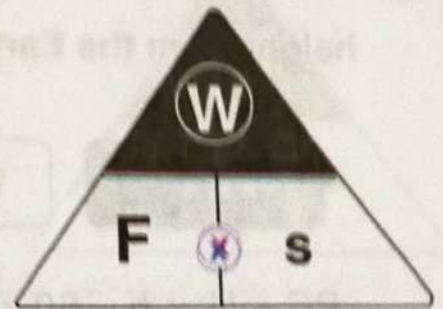
- ① A person applies a force of 20 N to an object, causing it to move 50 m in a straight line in the same direction as the force. Calculate the work done.

$$W = ?$$

$$F = 20 \text{ N}$$

$$s = 50 \text{ m}$$

$$W = F \times s = 20 \times 50 = 1000 \text{ J}$$



- ② If the work done to move a box a displacement of 5 meters is 1 kJ, calculate the force applied to do this work.

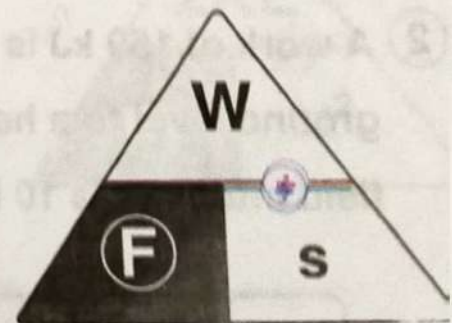
$$W = 1 \text{ KJ}$$

$$F = ?$$

$$s = 5 \text{ m}$$

$$W = 1 \times 1000 = 1000 \text{ J}$$

$$F = \frac{W}{s} = \frac{1000}{5} = 200 \text{ N}$$



- ③ If 60 joules were necessary to move a 4 N box, calculate the displacement that the box covers in the force direction.

$$W = 60 \text{ j}$$

$$F = 4 \text{ N}$$

$$s = ?$$

$$s = \frac{W}{F} = \frac{60}{4} = 15 \text{ m}$$



6 Comparison:

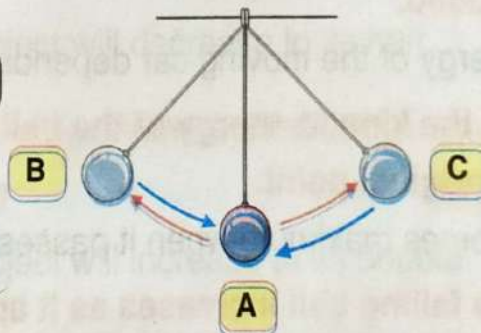
P.O.C	Potential Energy (PE)	Potential Energy (KE)
Definition	It is the energy stored in an object as a result of the work done on it.	It is the energy gained by an object as a result of its motion.
Affecting Factors	<ol style="list-style-type: none"> Object's weight (W) Object's height (h) 	<ol style="list-style-type: none"> Object's mass (m) Object's speed (v)
Mathematical Relation	$PE = m g h$	$KE = \frac{1}{2} m v^2$
Measuring Unit	Joule (J)	Joule (J)

7 Drawing:

Simple Pendulum

At the highest point

PE → Maximum
 KE → Zero
 Speed → Zero



At the highest point

PE → Maximum
 KE → Zero
 Speed → Zero

At its original position

PE → Zero
 KE → Maximum
 Speed → Maximum

During the Movement From	Potential Energy	Kinetic Energy
(B) → (A)	Decreases	Increases
(A) → (C)	Increases	Decreases
(C) → (A)	Decreases	Increases
(A) → (B)	Increases	Decreases

8 Give reasons for:

1. The man pushing the wall does not do any work.

Because the force acting on the wall doesn't cause its movement.
(Displacement = Zero)

2. The girl pushing the cart is doing work.

Because the direction of the acting force is in the same direction of the cart's motion.

3. The potential energy of an object on the ground equals zero.

Because the potential energy of the object depends on its height.

4. The role of fuel in the car is similar to the role of food in the human body.

Because chemical energy is released and converted into kinetic energy during the chemical reaction.

5. The kinetic energy of a fast car is greater than the slower car even though they have equal masses.

Because the kinetic energy of the moving car depends on its speed.

6. The kinetic energy of a truck is greater than that of a car even though they move with the same speed.

Because the kinetic energy of the moving car depends on its mass.

7. In a simple pendulum, the kinetic energy of the ball becomes maximum when it passes through the original point.

Because its speed becomes maximum when it passes through the original point.

8. The kinetic energy of a falling ball increases as it approaches the ground.

Because the speed of the ball increases gradually during falling down, and the kinetic energy depends on the object's speed.

9. The mechanical energy of an object falling from a certain height remains constant.

Because the decrease in potential energy equals the increase in kinetic energy.

10. The mechanical energy of an object at the maximum height equals its potential energy.

Because mechanical energy is the sum of the potential energy and kinetic energy of the object, and the kinetic energy equals zero at the maximum height.

11. The mechanical energy of an object when it reaches the ground equals its kinetic energy.

Because mechanical energy is the sum of the potential energy and kinetic energy of the object, and the potential energy equals zero when the object reaches the ground.

9 What happens if:

1. An object moves in a straight line in one direction?

The distance (d) and the displacement (s) become the same.

2. An object returns to its starting point?

The displacement (s) of this object becomes zero.

3. Vehicles exceed the permitted speed limits?

They cause road accidents.

4. You push a table with a suitable force?

The table will move a certain displacement in the direction of the force.

5. The magnitude of the force applied on an object increases?

The work done will increase.

6. The force applied on an object decreases to its half, and its displacement remains constant?

(According to the work done)

The work done on the object will decrease to its half.

7. The force applied on an object remains constant, and its displacement increases to its double?

(According to the work done)

The work done on the object will increase to its double.

8. The force applied on an object decreases to its half, and its displacement increases to its double?

(According to the work done)

The work done on the object remains constant.

9. An object's weight is doubled and its height is constant?

(According to the potential energy)

The potential energy will increase to its double.

10. An object's height is doubled and its weight is constant?

(According to the potential energy)

The potential energy will increase to its double.

11. An object's weight decreases to its half and its height is constant?

(According to the potential energy)

The potential energy will decrease to its half.

1 Definitions:

Ecosystem	It is any area that consists of living organisms and non-living components.
Biological community	It contains the various populations of different species that inhabit the same environment.
Biotic population	It is a group of individuals of the same species that live in a particular place at the same time.
Individual	It is a single living organism belonging to a specific species.
Species	It is the fundamental unit in the classification of living organisms.
Predation	It is a nutritional relationship between two living organisms; one is called a predator and the other is called prey.
Predator	It is the organism that benefits from the predation relationship.
Prey	It is the organism that is harmed or loses its life in the predation relationship.
Competition	It is a nutritional relationship between two individuals of the same species for a food source that is found in limited quantities, which negatively impacts their growth or survival.
Mutualism	It is a food relationship between two individuals where they benefit from each other without causing harm to either of them.
Commensalism	It is a nutritional relationship between two individuals in which one organism, known as the commensal, benefits, while the other organism, known as the host, is neither benefited nor harmed.
Commensal	It is the organism that benefits from the commensal relationship.
Host	It is the organism that neither benefits nor is harmed in the commensal relationship.
Producers	They are autotrophic organisms that can make their own food through photosynthesis.
Consumers	They are heterotrophic organisms that depend directly or indirectly on producers to obtain food.
Herbivores	They are consumers that feed on plants only
Carnivores	They are consumers that feed on animals only
Omnivores	They are consumers that feed on both plants and animals
Scavengers	They are consumers that feed on the remains of dead organisms.
Decomposers	They are living organisms that obtain their food from the dead bodies.

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10 Applications:

1 Medical Application: Lifting heavy objects:

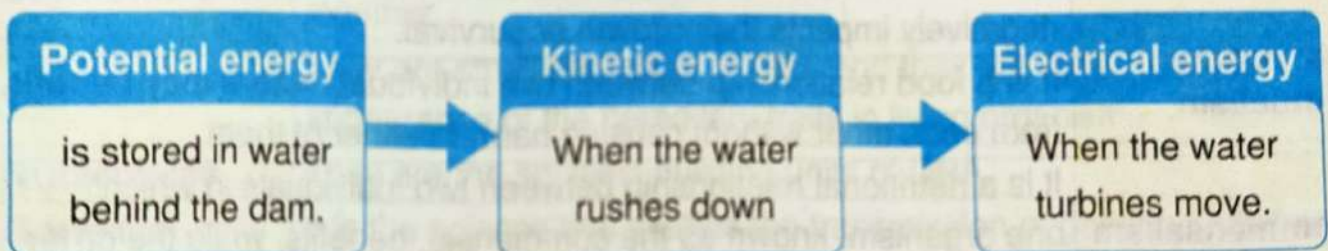
Avoid lifting heavy objects above ground level in a way that harms your **spine**.

The load should be supported by the **leg muscles** rather than the **back** to ensure balanced **weight distribution**.



2 Generation of Electricity from the High Dam:

Energy Transformations



3 Demolition Ball:

Its structure: It is a heavy ball that is suspended at a height.

Its importance: It is used for demolishing old buildings.

Energy transformations:



- 1 The potential energy stored in the heavy ball is converted into kinetic energy.
- 2 This energy is transferred to the building upon the ball impact, causing its demolition.

12. An object's height decreases to its half and its weight is constant?

(According to the potential energy)

The potential energy will decrease to its half.

13. An object's weight is doubled, while the object's height decreases to its half

(According to the potential energy)

The potential energy remains constant.

14. An object's mass is doubled and its speed is constant?

(According to the kinetic energy)

The kinetic energy will increase to its double.

15. An object's speed is doubled and the object's mass is constant?

(According to the kinetic energy)

The kinetic energy will increase four times its value.

16. An object's mass decreases to its half and its speed is doubled?

(According to the kinetic energy)

The kinetic energy will increase to its double.

17. An object's mass decreases to its quarter and its speed is doubled?

(According to the kinetic energy)

The kinetic energy remains constant.

18. A ball falls down from a certain height?

(According to the kinetic, potential, and mechanical energy)

- The mechanical energy of the ball remains constant.
- The potential energy of the ball decreases gradually.
- The kinetic energy of the ball increases gradually.

19. A ball is thrown upward?

(According to the kinetic, potential, and mechanical energy)

- The mechanical energy of the ball remains constant.
- The potential energy of the ball increases gradually.
- The kinetic energy of the ball decreases gradually.

20. The ball of a pendulum is released to move freely?

The ball of the pendulum moves right and left around its original point, where speed of the ball decreases gradually by moving away from the original point and its speed becomes maximum when it passes through the original point.

Food chain	It is the path of energy transfer (flow) in the form of food as it moves from one organism to another within the ecosystem.
Biological control	It is a food system that uses living organisms to eliminate agricultural pests instead of using pesticides.
Food webs	They include the interconnection and overlapping of multiple food chains.
Energy pyramid	It is a pyramid that represents the flow of energy and its amounts between the different trophic levels in any food chain.
Reproduction	It is the process of producing new individuals (offspring) resembling their parents.
Genetic (hereditary) traits	They are traits that are transmitted from parents to offspring without learning. They are traits that are inherited from one generation to the next.
Acquired traits	They are traits that are not inherited from parents but are acquired from the surrounding environment through learning or training.
Instinctive behaviors (Instinct)	They are behaviors and skills that are transmitted from parents to offspring without learning.
Chromosomes	They are thread-like bodies that represent the genetic material of a living organism.
Centromere	It is a central point that connects two chromatids of a chromosome together.
Genes	They are small segments of DNA and they are responsible for the appearance of the hereditary traits in living organisms.
Nucleotides	They are the smallest building units of DNA.
Genetics (Heredity)	It is the science that studies the transmission of genetic traits from parents to offspring.
Mutation	It is the emergence of a new hereditary trait that did not exist previously, resulting from a change in the nature of the gene responsible for it.
Spontaneous mutations	They are mutations that may occur naturally without human intervention.
Induced mutations	They are mutations that occur through human intervention.
Harmful mutations	They are mutations that occur naturally without human intervention and have harmful impacts.
Lethal mutations	They are mutations that occur naturally without human intervention and cause death.
Beneficial mutations	They are mutations that occur naturally or through human intervention.

P.O.C	Producers	Consumers
Definition	They are autotrophic organisms that can make their own food through photosynthesis	They are heterotrophic organisms that depend directly or indirectly on producers to obtain food.
Examples	Green plants – Algae	Horses – Lions – Bears – Hyenas

P.O.C	Herbivores	Carnivores
Type of Food	They feed on plants only.	They feed on animals only.
Teeth	They have incisors for cutting plants.	They have sharp canines for tearing the prey.
Examples	Horses – Cows – Rabbits	Lions – Tigers – Snakes

P.O.C	Omnivores	Scavengers
Definition	They feed on both plants and animals.	They feed on the remains of dead organisms.
Examples	Bears – Ravens – Hedgehogs	Hyenas – Eagles – Cockroaches

P.O.C	Genetic Traits	Acquired Traits
Definition	They are traits transmitted from parents to offspring without learning.	They are traits that are not inherited from parents but are acquired from the surrounding environment through learning or training.
Examples	Eye colors Hair colors	Learning to walk Learning languages

Examples of Instinctive Behaviors



A bat sleeping upside down



A chicken incubating its eggs

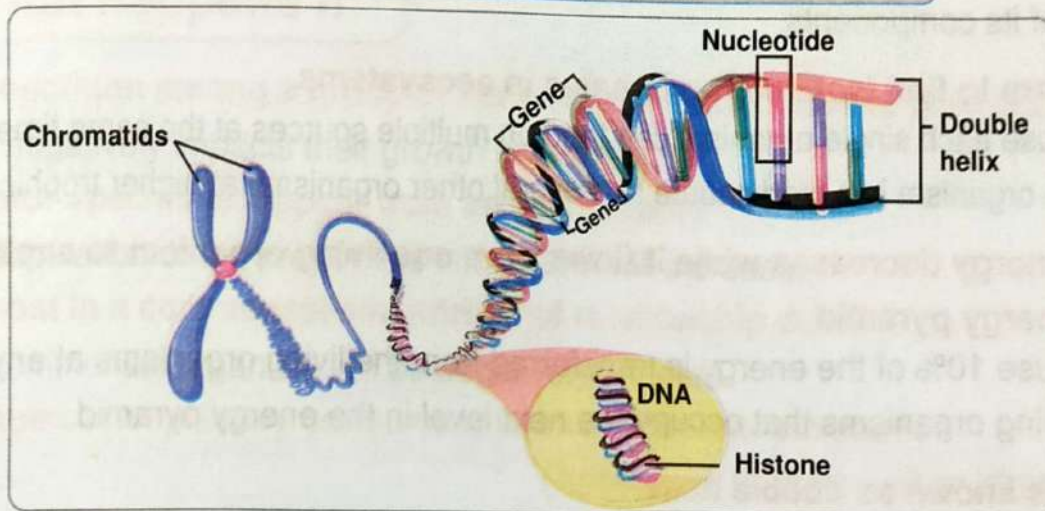


A spider weaving its web to catch insects



A bird building its nest

The Structure of Chromosomes



7 Give reasons for:

1. The food relationship between bees and plant flowers is mutualism.

Because bees benefit by extracting nectar from the flower, while the plant benefits from the transfer of its pollen grains on the bodies of the bees from one flower to another to promote floral reproduction.

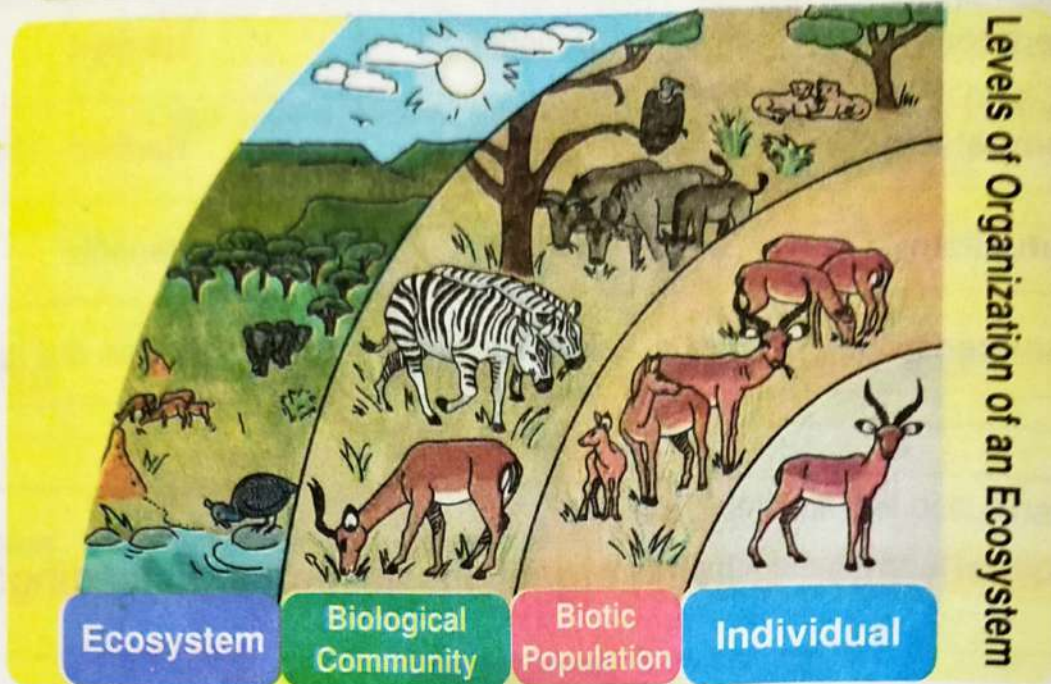
2. The nutritional relationship between the Nile crocodile and the Egyptian plover is a commensal relationship.

Because this nutritional relationship benefits the Egyptian plover bird by feeding on the leftover food trapped in the crocodile's teeth, while the crocodile neither benefits nor is harmed.

3. Plants are considered autotrophic organisms.

Because they can make their own food through photosynthesis.

Levels of Organization of an Ecosystem



Examples of Genetic (Hereditary) Traits



Eye colors



Hair colors



Short legs of
the Arctic fox



Long neck of
the giraffe

Examples of Acquired Traits



Learning languages



Learning to walk



A dolphin playing
with a ball

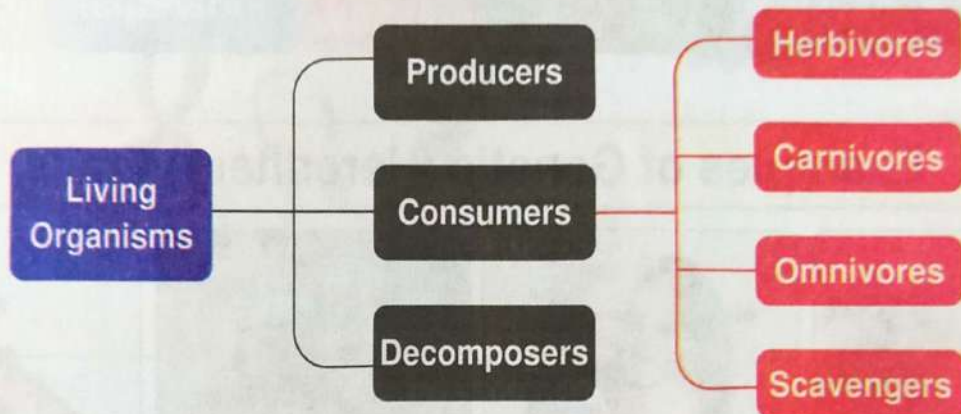


A horse jumping
over obstacles

2 Food relationships:

Food Relationship	One Organism	Other Organism
1 Predator	Benefits	Harmed
2 Competition	Harmed	Harmed
3 Mutualism	Benefits	Benefits
4 Commensalism	Benefits	Neither benefits nor harmed

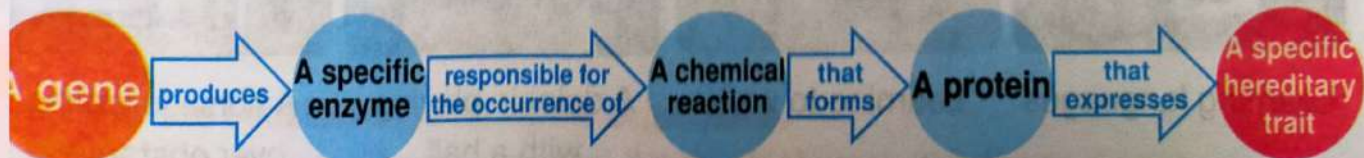
3 Classification of living organisms according to feeding:



4 The number of chromosomes:

Living Organism	Humans	Bees	Corn plants
Number of Chromosomes	46	32	20

5 One gene-one enzyme hypothesis:

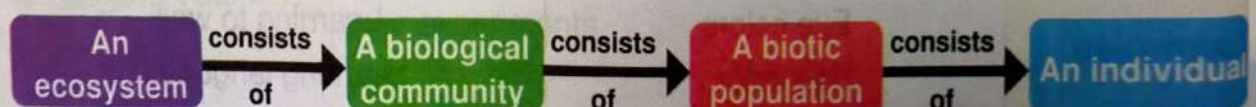


P.O.C	Spontaneous Mutations	Induced Mutations
Definition	They are mutations that may occur naturally without human intervention	They are mutations that occur through human intervention.
Example	A dark-skinned mother giving birth to an albino child	The production of featherless chickens

P.O.C	Harmful Mutations	Beneficial Mutations
Definition	They are mutations that occur naturally without human intervention.	They are mutations that occur naturally or through human intervention.
Examples	<ul style="list-style-type: none"> • Harmful mutation: Spinal deformity • Lethal mutation: The severe muscular dystrophy 	<ul style="list-style-type: none"> • Beneficial mutations occur spontaneously, such as: The change in skin color to adapt to the environment • Beneficial mutations occur through human intervention, such as: <ul style="list-style-type: none"> – Production of seedless fruits – Production of wheat plants resistant to wheat rust disease

5 Remember:

1 Levels of organization of an ecosystem:



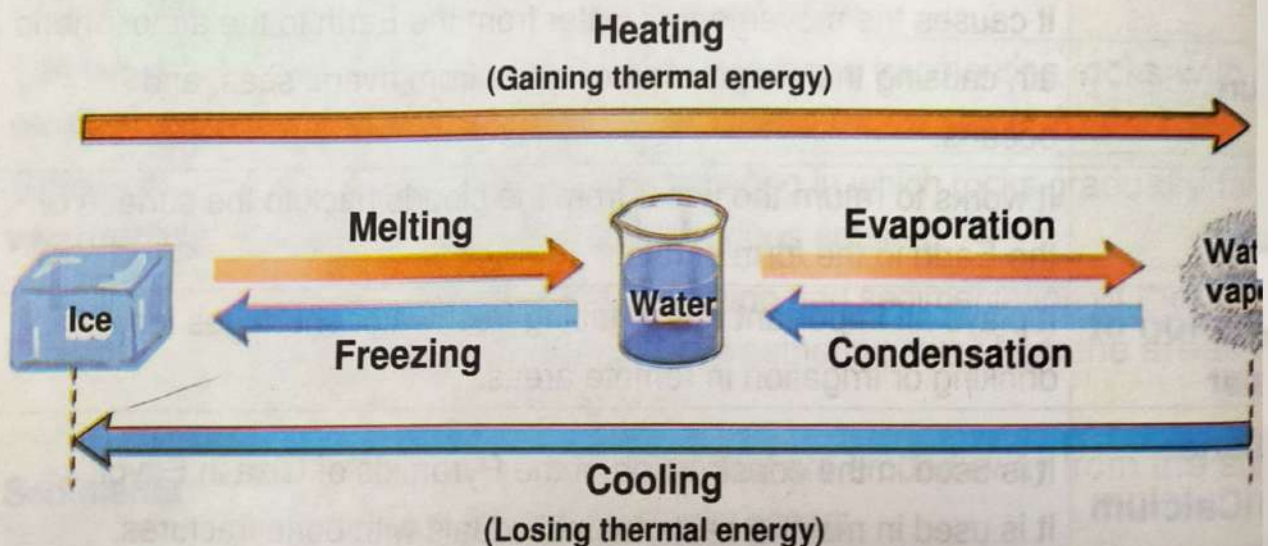
4. **Consumers are considered heterotrophic organisms.**
Because they depend directly or indirectly on producers to obtain food.
5. **Carnivorous animals have sharp canines.**
Because they help them in tearing the prey.
6. **Herbivorous animals have incisors.**
Because they help them in cutting plants.
7. **Studying food chains is important for the biological control.**
Because the study of food chains is used in designing food systems that help eliminate agricultural pests instead of using pesticides.
8. **Decomposers have an important role for the soil.**
Because decomposers break down the organic substances found in the bodies of the dead organisms to simpler substances, which mix with the soil and become part of its components.
9. **It is rare to find isolated food chains in ecosystems.**
Because each single organism can feed on multiple sources at the same time, and a single organism is a food source for several other organisms at higher trophic levels.
10. **The energy decreases while it flows from one living organism to another in the energy pyramid.**
Because 10% of the energy is transferred from the living organisms at any level to the living organisms that occupy the next level in the energy pyramid.
11. **DNA is known as double helix.**
Because DNA is arranged in the form of two strands twisted around each other.
12. **DNA is responsible for the appearance of the hereditary traits in the living organism.**
Because DNA is made up of small segments called genes, which are responsible for the appearance of the hereditary traits.
13. **Genes are responsible for the appearance of specific hereditary traits in an individual.**
Because each gene produces a specific enzyme that is responsible for the occurrence of a chemical reaction, leading to the formation of a protein expressing a specific hereditary trait.
14. **The genes present on a single chromosome differ.**
Due to the difference in the arrangement of the nucleotides on DNA.
15. **A dark-skinned mother giving birth to an albino child is considered a spontaneous mutation.**
Because it occurs naturally without human intervention.

3 Mention the number that indicates:

70%	It is the percentage of water in human body.
71%	It is the percentage of water on Earth's surface.
29%	It is the percentage of land on Earth's surface.
97%	It is the percentage of salt water on Earth's surface.
3%	It is the percentage of fresh water on Earth's surface.
90%	It is the percentage of methane in natural gas.

4 Remember:

1 Changing the state of water by changing the temperature



- The melting process is opposite to the freezing process.
- The evaporation process is opposite to the condensation process.

Sedimentary rocks	They are cohesive rocks formed through lithification of sediments.
Metamorphic rocks	They are rocks that resulted from subjecting rocks under the Earth's surface to pressure and heat without reaching the melting point.
Magma	It is a very hot, thick molten material formed from the melting of minerals that make up certain rocks in the Earth's interior.
Lava	It is the magma when it reaches the Earth's surface.
Igneous rocks	They are rocks formed as a result of the cooling of magma in the cracks and layers within the Earth's crust or lava on the Earth's surface.
Rocks cycle	It is the transformation of rocks from one type to another through several processes, such as weathering and erosion, extreme pressure and heat, and melting and cooling.
Fossil fuel	It is the fuel that was formed millions of years ago as a result of a series of physical and chemical changes of organic substances in the Earth's interior.

2 Mention the importance of:

Water	It is used in drinking, agriculture, industry, and sanitation. It regulates the temperature of the Earth planet.
Water cycle	The water in bodies of water is renewed through the continuity of it. It illustrates the mutual relation between the components of the system and their impacts on the environment.
The Sun	It causes the movement of water from the Earth to the atmospheric air, causing the evaporation of water from rivers, seas, and oceans.
Gravity	It works to return the water from the clouds back to the surface of the Earth in the form of rain.
Desalination of seawater	It plays an important role in facing freshwater shortages for drinking or irrigation in remote areas.
Limestone rocks (Calcium carbonate)	It is used in the construction of the Pyramids of Giza in Egypt. It is used in making casts for individuals with bone fractures.
Marble	It is used in the construction of the Taj Mahal in India.

حمل الآن

مجانا وحصريا

المراجعة رقم (3)

اختبار شهر مارس



(Lesson-1) Potential Energy

Distance, displacement and velocity:

When a camel wanders in the desert, its owner follows its footsteps to find out its path, the path of any moving body is defined as the set of points it passes through during its movement.

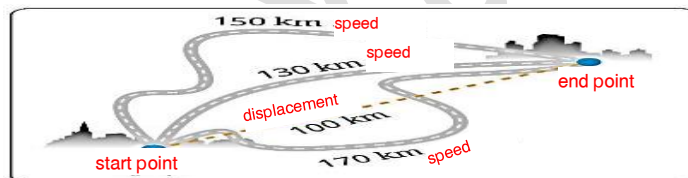


The set of points defined for the path



Traces of a camel's on the sand

the opposite figure describes the total length of any path taken by the body while moving from the starting point to the end point, (the distance), and the shortest straight path connecting the starting point and the end point in a constant direction (the displacement)

**Cross-cutting concepts: scale, ratio, and proportion:**

Both distance and displacement are measured in the same unit of measurement, which is the meter (m) or its multiples, such as kilometer (km), or parts of it such as centimeter (cm).

$$1\text{ km} = 1000\text{ m}, 1\text{ m} = 100\text{ cm}$$

The distance traveled per unit of time is:

Speed (v)

Speed is measured from the following mathematical relationship

Speed (v)	distance (d)
	time (t)

Speed is measured in several units, including:

meter/second (m/s)

kilometer/hour (km/h)

Mathematical understanding:

Calculate the speed of a body that covers a distance of 8m in a time 2s

$v = \frac{d}{t} = \frac{8}{2} =$	distance (d)	= 4m/s
	time (t)	

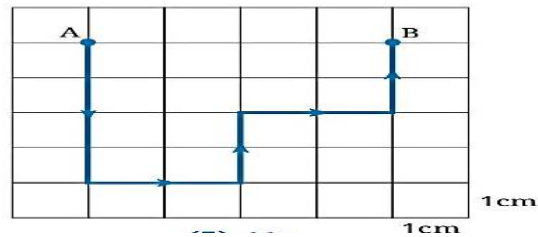
Evaluate your understanding:

-The following figure shows the path of a body from point (A) To point (B) in a time of 24s : Calculate the amount of each of:

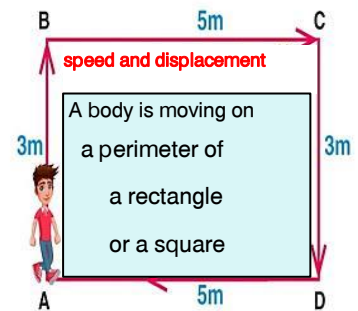
(1) Distance.

(2) Speed.

(3) Displacement.



-The following figure shows a student walking on a closed path. Calculate the distance he covered? Calculate his displacement.

**Work (W):**

It is said about a weightlifter that:

He does no work while standing, but he does work while he is getting up .

It is clear from the above:

Force does work when it affects an object, causing it to move in the same direction as its effect. the greater the amount of force, the greater the work done.



Work (W)

The amount of energy required to move an object a certain displacement in the same direction as the force acting on it.

Joule
Newton
Meter

Work is measured in units joule (J)

Force is measured in newton (N)

Displacement is measured in meter (m)

Joule
Newton
Meter

The work must be done from the following mathematical relationship:

$$\text{Work (W)} = \text{Force (F)} \times \text{Displacement (S)}$$

Mathematical understanding:

A person pushes an object with force 20N, It moved in a straight line a distance of 50M in the same direction of force.

-Calculate the amount of work done.

$$W = F \times S = 20 \times 50 = 1000\text{j}$$

Analytical thinking:

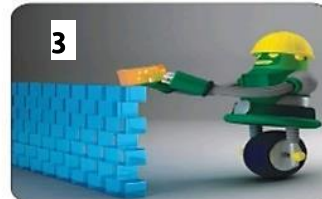
Each robot in the form does work in lifting a number of bricks to different heights.



It applies a force of 20N on 2 bricks to lift it 3m vertically



It applies a force of 30N on 3 bricks to lift it 3m vertically



It applies a force of 10N to 1 brick to lift it 3m vertically



It applies a force of 30N on 3 bricks to lift it 2m vertically

Explain mathematically how many robots do the same amount of work.

.....
.....

Energy (E):**Energy**

It is the ability to do work, and is measured in units of joules (J)

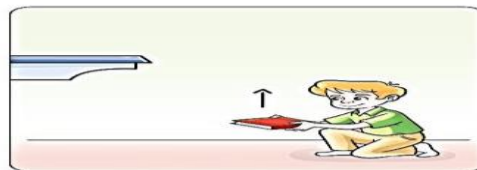
From energy images:

potential energy

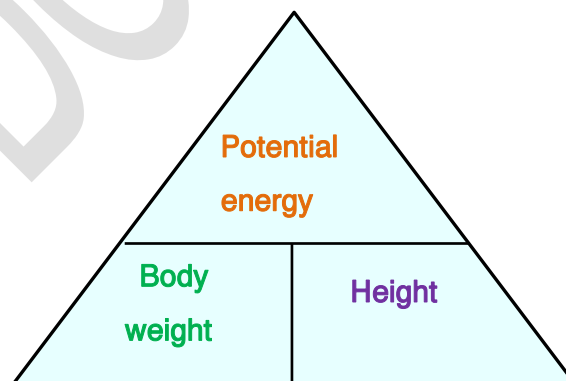
kinetic energy

Potential energy (PE):

When a person lifts a book to a shelf high above the ground, he does work that turns into energy stored in the book.



The energy stored in the body, as a result of the work done on it, is known as potential energy.

**Scientific processes in controlling variables:**

Controlling variables is one of the skills of scientific research and designing scientific comparative experiments, Controlling variables is necessary to study the causes and consequences resulting from them.

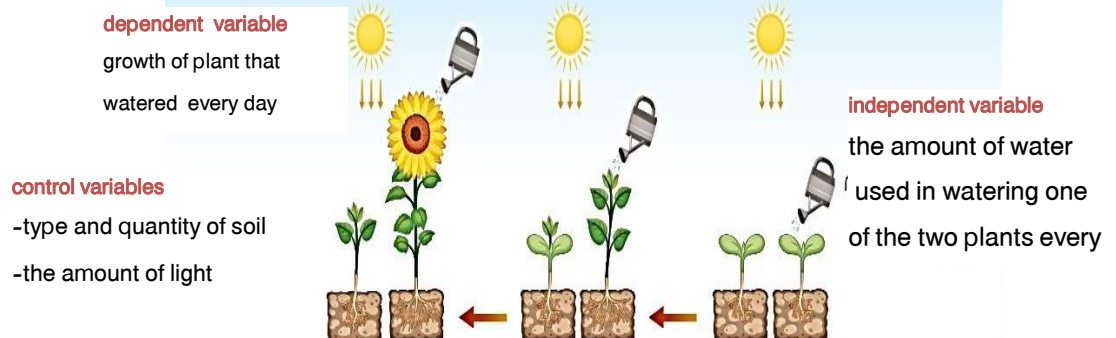
The three most important variables are:

Independent variable (cause): The variable that is changed during the experiment.

Dependent variable (outcome): The variable to be tested that changes with the change in the independent variable.

Control variables: variables that remain constant during the experiment.

Application:



It is clear from the above:

Objects elevated above the Earth's surface have potential energy (PE)

Its amount depends on each of:

Body weight (w) its unit of measurement is Newton (N)

The height of the body above ground level (h) its unit of measurement is meter (m)

The potential energy is determined from the following relationship:

Potential energy (PE) = Body weight (W) X Height (h)

Potential energy is measured in joule (J)

Body weight (w) = body mass (m) x gravitational field strength (g)

Potential energy (PE) = body mass (m) x gravitational field strength (g) x height (h)

[The strength of the Earth's gravitational field is approximately equal to 10 N/kg]

Mathematical understanding:

A body of mass 50kg from the ground to height H above the ground by 150 work.
Note that the intensity of the Earth's gravitational field $1\text{KJ} = 1000 \text{ J}$, 10N/kg

calculate:

(1) potential energy of the body.

The potential energy of a body represents the amount of work done on the body.

Potential energy of the body = 150 KJ

(2) The amount of height (h)

$$PE = mgh$$

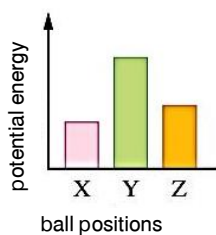
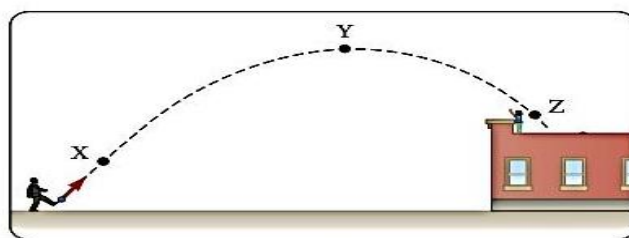
$$150 \times 1000 = 50 \times 10 \times h$$

$$h = \frac{150 \times 1000}{50 \times 10} = 300 \text{ m}$$

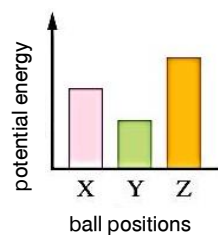
Evaluate your understanding:

The figure shows the path of a soccer ball kicked by a player, The letters (X), (Y), (Z) represents three positions in the path of the ball's movement.

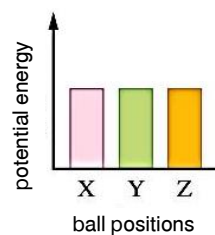
Which of the following expresses the potential energy of the ball in the three positions X, Y, Z?



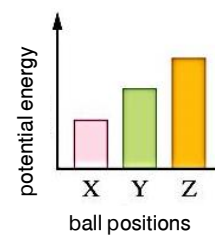
A



B



C



D

Integration with chemistry:

The chemical energy in food and fuel is potential energy stored in chemical bonds, which is released and converted into kinetic energy when a chemical reaction occurs.



Questions

Choose the correct answer:

1- The following figure represents an experiment that included four attempts (W), (X), (Y), (Z):

Which of the following represents the controlling variable and the independent variable?

Choices	Independent variable	Control variable	The two attempts
A	Mass	Height	(W),(X)
B	Mass	Height	(W),(Y)
C	Height	Mass	(X), (Y)
D	Mass	Height	(X), (Z)

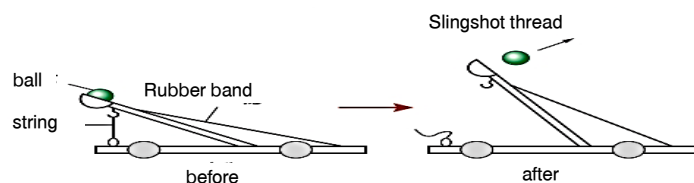
2- In which of the following cases is work done?

- (a) Picking up a bag from the floor, pushing a shopping cart.
- (b) Carrying a backpack and walking with it, Pushing a shopping cart.
- (c) Picking up a bag off the ground, pushing a tree.
- (d) Carrying a backpack and walk with it, pushing a tree.

3- The potential energy of a body depends on

- (a) Its weight and speed.
- (b) Its weight and mass.
- (c) Its speed and height above the Earth's surface.
- (d) Its weight and height above the ground.

4- The following figure shows the motion of a ball after the slingshot string is cut:



Choices	Because the rubber band stores potential energy	Change
(A)	less before cutting the thread.	use a larger mass ball.
(B)	larger before cutting the thread.	use a longer rubber band.
(C)	less before cutting the thread.	use a shorter rubber band.
(D)	greater before cutting the thread.	use shorter rubber.

5- The shortest straight path between the starting point and the ending point is known as:

- (A) Distance (B) Displacement (C) Speed

6- The unit of work is:

- (A) Newton (B) Joule (C) meter

7- The correct relationship to calculate potential energy is:

- (A) $PE = m \times g \times h$ (B) $PE = F \times S$ (C) $PE = t/d$

8- The variable that is changed during an experiment is known as the:

- (A) Dependent variable
(B) Independent variable
(C) Control variable

9- The strength of the Earth's gravitational field is approximately equal to:

(A) 10 N/m

(B) 10 N/kg

(C) 9.8 m/s²

Calculate:

The time how taken by a car moving at a speed of 40 m/s to cover a distance of 200m

.....

Calculate height body with a mass of 6kg above the ground when its potential energy is 180J knowing that Earth's gravitational field strength is 10 N/KG.

.....

What does it mean that the speed of a body 100 m/s?

.....

Causes:

1- The weight lifter does work while lifting the weight.

.....

2- The body has no potential energy when it is on the surface of the Earth.

.....

3- Chemical energy is released when a chemical reaction occurs.

.....

Complete:

1- Distance and displacement are measured in units of or its multiplies such as....

2- Work is calculated from the relationship: Work (W) = ×

3- Potential energy depends on ...the body and ... above the Earth's surface.

4- The relationship between body weight and mass is written: body weight = \times

Correct the mistake:

1- Speed is measured in Newtons.

2- Work is always done only when there is a force.

3- Potential energy does not depend on the mass of the body.

4- Potential energy equals (S \times W).

comparison:

1- Compare distance and displacement:

displacement	Distance

2- Compare energy and work:

Work	Energy

Mathematical sum:

Robot A lifts 5 bricks with a weight of 20N each to a height of 3m.

Robot B lifts 10 bricks with a weight of 10N each to a height of 1.5m.

Calculate the work done by each robot, and determine which one does the same work.

.....

(Lesson-2) Kinetic Energy**Kinetic energy: KE**

The work done by the truck is greater than the work done by the car even though their speeds are the same, why?



The work done by the blue car is greater than the work done by the red car even though their masses are equal, why?

It is clear from the above:

Kinetic energy of any body (KE) depends on each of:

Body mass (m) its unit of measurement is kilogram (kg)

Body speed (v) its unit of measurement is meter/second (m/s).

Kinetic energy is determined from the following mathematical relationship:

$$\text{kinetic energy (KE)} = \frac{1}{2} \text{ mass (m)} \times \text{velocity squared (V)}^2$$

Kinetic energy is measured in joule (J)

Mathematical understanding:

Calculate kinetic energy of a metal ball of mass 2kg moving at a speed of 3m/s

$$\begin{aligned} \therefore \text{KE} &= \frac{1}{2} Mv^2 \\ &= \frac{1}{2} \times 2 \times (3)^2 \\ \therefore \text{KE} &= 9\text{j} \end{aligned}$$

Evaluate your understanding:

Two bodies (X) and (Y), the mass of the body (X) is twice the mass of the body (Y), and the speed of the body (X) is half the speed of the body (Y).

Is the kinetic energy of the body (X) equal to the kinetic energy of body (Y)?
with explanation.

.....

Cross-cutting concepts: cause and effect:

- Increasing the mass of the moving body leads to an increase in Kinetic energy, and vice versa.
- Increasing the speed of a moving body leads to an increase in Kinetic energy, and vice versa.

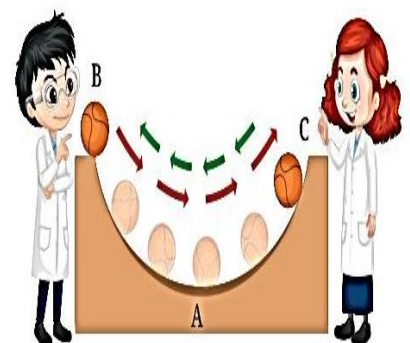
Scientific skills:

Compare potential energy (PE) and kinetic energy (KE), by completing the table:

	kinetic energy (KE)	potential energy (PE)
Definition
Influencing factors
The mathematical relationship used in the calculation
Unit of measurement

The relationship between potential and kinetic energy:

When the ball is lifted from its original position A to position B, potential energy is stored in the ball, and when it is allowed to fall, the potential energy is converted into kinetic energy.



It is clear from the above:

- The potential energy of a body is greatest at its maximum height above its original position.
- Kinetic energy is greatest when it passes through its original position.
- A decrease in potential energy is followed by an increase in kinetic energy.
- The decrease in potential energy is equal to the increase in kinetic energy.
- The sum of the potential and kinetic energies of any moving body with mechanical energy (ME).

The mechanical energy of any body is equal to a constant amount, determined by the following mathematical relationship:

$$\text{Mechanical energy (ME)} = \text{Potential Energy (PE)} + \text{Kinetic Energy (KE)}$$

The mechanical energy of a freely falling body is equal to:

- The potential energy at maximum height.
- Kinetic energy at the moment of reaching the Earth's surface.

Evaluate your understanding:

A car descends from a resting position (A) on a slope until reaching the ground surface at point (C), if the mechanical energy of the car is 600 KJ at position (B).

Determine the value of each of the following for the car:

1- Potential energy at the position (A)

.....

2- Kinetic energy at the position (C)

.....

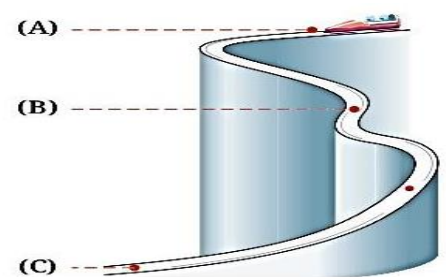
Calculate each of the following for the car:

1- Potential energy at the midpoint of the vertical distance between the two positions (A) (C)

.....

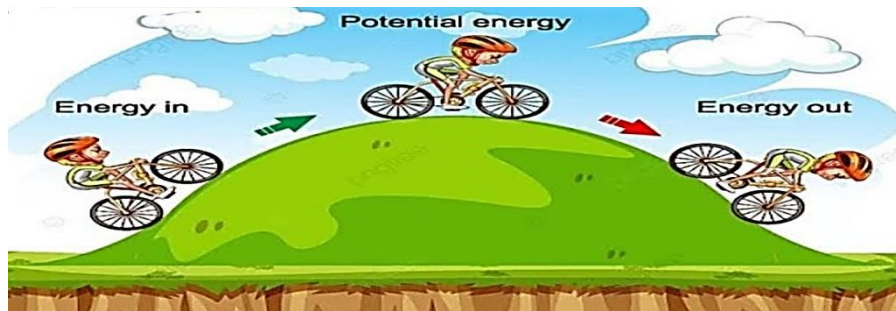
2- Kinetic energy at position (B), if its potential energy is equal to KJ 400

.....



Intermittent concepts: cause and effect

An increase in the potential energy of a body moving vertically upwards results in a **decrease** in kinetic energy by the same amount, and vice versa.



Medical application:

Avoid lifting heavy objects high off the ground in a way that harms your spine, so that the load is not on the back but on the leg muscles to ensure a balance distribution of weight.

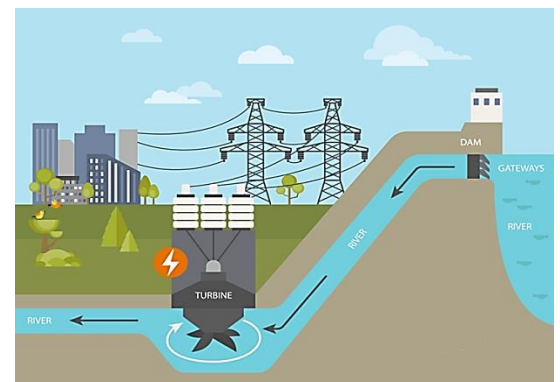


Life App:

(1) Electricity generation from the High Dam:

The Aswan High Dam is one of the most important engineering projects in Egypt in the last century to exploit water energy, as the potential energy of the water held behind the dam is converted into kinetic energy when it rushes down.

This kinetic energy of water causes turbines to operate, generating electricity in a sustainable manner.



(2) Demolition ball:

The wrecking ball is used to demolish old buildings as a result of the potential energy stored in the heavy ball suspended at a height being converted into kinetic energy when it is released.

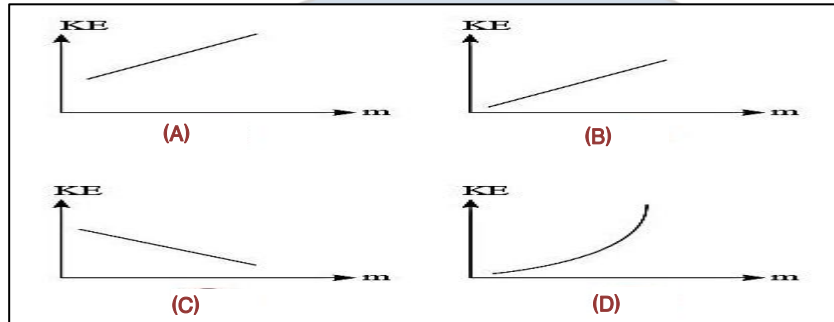
This energy is transferred to the building when the ball hits it, causing it to collapse.



Questions

Choose the correct answer:

1- The relationship between the kinetic energy of a body and the mass of several bodies when their speed is constant is expressed graphically...



2- Which of the following represents the change in potential energy and kinetic energy of a body falling from a high place?

Choices	potential energy	Kinetic energy
(A)	Decrease	Decrease
(B)	Decrease	It increases
(C)	It increases	It increases
(D)	It increases	Decrease

3- When the masses of two cars are equal, the car that does more work is:

- (A) faster (B) slower
(C) At the same speed (D) heavier

4- The mechanical energy of a body moving vertically upward is equal to:

- (A) Potential energy only
- (B) Kinetic energy only
- (C) Sum of potential energy and kinetic energy
- (D) The difference between potential energy and kinetic energy.

5- The unit of mass in the kinetic energy equation is:

(A) meter/second

(B) kilogram

(C) Newton

(D) Joule

What does it mean that the mechanical energy of a body is equal to 200J?

.....

What happens to the kinetic energy of a body in the following cases, when...

(1) The mass of the moving body is halved, while its speed remains constant.

(2) The speed of the moving body increases to double, while its mass remains constant.

Correct the mistake in the following sentences:

1- Increasing the speed of a moving body leads to a decrease in kinetic energy.

.....

2- The mechanical energy of a freely falling body increases gradually.

.....

3 -Converting the potential energy of the water held behind the High Dam into electrical energy is done directly.

.....

Show causes:

The work done by the truck is greater than the work done by the car, even though their speeds are equal.

.....

The kinetic energy of a body increases with increasing its speed.

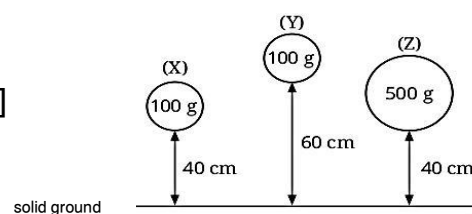
.....

Wrecking ball is capable of demolishing buildings.

.....

The following figure shows three objects falling to the Earth's surface from different heights:

[Knowing that the strength of the Earth's gravitational field 10N/kg]



-Put a check mark (✓) or (✗) in front of the following phrases:

- (1) potential energy of ball X is greater than the potential energy of ball Z ()
- (2) The potential energy of ball Y is greater than the potential energy of ball X. ()
- (3) Balls Z, Y, X are gained kinetic energy when they falling. ()
- (4) Ball Y hitting the ground makes a louder noise than ball Z hitting it. ()

-Calculate the kinetic energy of a body of mass 12KG is moving at a speed of 1 m/s .

-A body of mass 10kg is dropped from a height 4m above ground.

[note that the strength of the Earth's gravitational field 10N/kg]

.....
Calculate the kinetic energy of the body in the following cases:

- 1-The moment before it fell.
- 2-The moment it reaches the Earth's surface.

Calculate the mechanical energy of the body at the midpoint between the point of fall and the ground.

A body of mass 600kg is thrown vertically upwards with a speed of 20m/s , calculate:

Note that: $[1000\text{g}] = \text{kg } 1$

- (1) The kinetic energy of a body at the moment it is thrown upwards.
- (2) The mechanical energy of the body at the maximum height reached by the body.

Calculate the mass of an object with kinetic energy of 80 J moving at a speed of 4 m/s .

Unit two exam

Complete the following:

- 1- The unit of energy measurement is
- 2- The weight of a body with a mass of 10kg is equal to Newtons.
- 3- The mechanical energy of a body is the sum of the energies of and
- 4- When the speed of a body decreases by half, its kinetic energy is
- 5- Gravitational potential energy is directly proportional to and

Choose the correct answer:

1-The variable that is changed during the experiment is known as:

- a) Dependent variable
- b) Independent variable
- c) Control variable

2- The unit of mass in the kinetic energy equation is:

- a) meter/second
- b) kilogram
- c) Newton
- d) Joule

3- The unit of work measurement is:

- a) Newton
- b) Joule
- c) meter

Mention the scientific term:

- 1- The sum of the potential and kinetic energies of a body
- 2- Weight multiplied by height
- 3- The shortest distance between two points
- 4- The energy that a body acquires due to its movement

Compare between:

Potential energy and kinetic energy in terms of definition, symbol and law

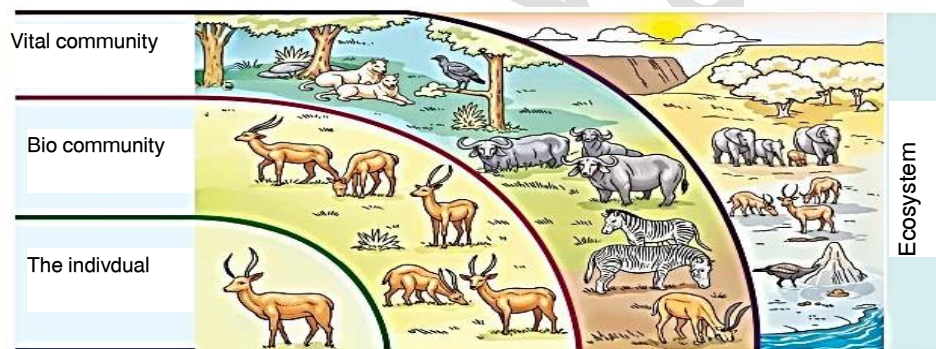
Show causes:

- 1- The work done in the case of a man carrying a bucket and walking a horizontal distance is equal to zero.
- 2- Kinetic energy is always positive.

Calculate the speed of a body with a kinetic energy of 200 joules and a mass of 16kg?

(Lesson-1) Relationships Food in biomes**Ecosystem:**

It Ecosystem consists of living organisms and non-living components such as water, air and soil, The ecosystem includes several levels of organization, it begins with the individual, which is a single living organism that belongs to a specific type of living organisms and represents species is the basic unit in the classification of living organisms, and it is the group of individuals of the same species that live in one place and time, which is known as a biotic community, the individuals of different biotic communities that live in the same environment constitute what is known as biotic community.

**Patterns of food interactions between members of biological communities:**

The ways in which living organisms obtain food vary, and with them their patterns of relationships vary.

There are relationships that result in harm to one of the two individuals, such as predation, or to both individuals together, such as **competition** and other relationships in which one of the two individuals benefits. **Such as commensalism.** or both individuals benefit without harm to either of them, such as mutual benefit.

Evaluate your understanding:

In light of your understanding of food relationship patterns, Explain the food relationship shown in each of the two following figures:

- Figure 1 shows the relationship
- Figure 2 shows the relationship

**Energy flow between objects:**

All living organisms need energy to survive. Producers get their energy from the sun, which is the main source of energy on the Earth's surface. Some of this energy is then transferred to other living organisms in different paths that include several levels through food chains and food webs.

It is clear from the above:

- The path of energy transfer in the form of food when it is transferred from one living organism to another living organism within the ecosystem is known as the food chain.
- Each stage in which energy is transferred in the food chain is known as Nutritional level.
- Any food chain, whether terrestrial, aquatic or desert, consists of several levels. The first level is occupied by a producer organism, the higher levels (second, third, etc) are occupied by consumer organisms, and it ends with a decomposer organism.
- Organisms that obtain their food from the bodies of dead organisms are known as decomposers, Because it decomposes the organic materials found in the bodies of other organisms after their death into simple materials that mix with the soil and become part of its components.

Life App:**sustainable agriculture...**

The study of food chains is useful in designing food systems in which living organisms are used to eliminate agricultural pests instead of using pesticides in what is known as biological control, such as using spotted beetles (ladybugs) to feed on aphids, which are agricultural pests that infect vegetables and fruits.

**Evaluate your understanding:**

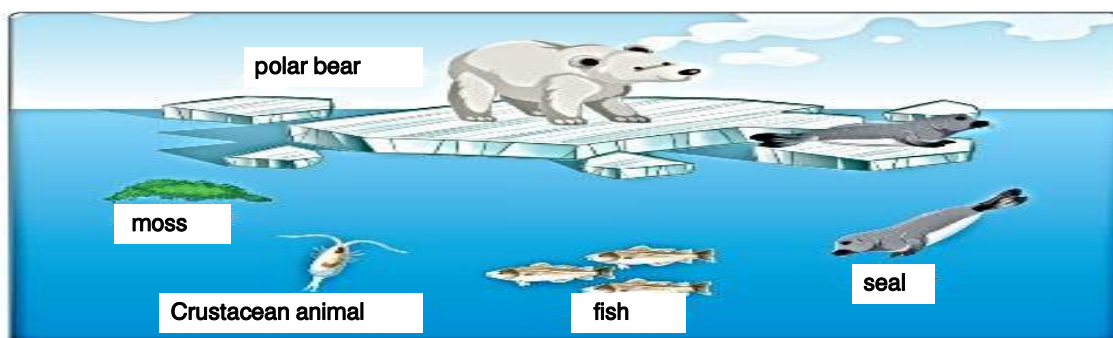
The figure in front of you shows some living organisms in an aquatic environment in the Arctic:

(1) Create a food chain from these organisms.

.....

(2) What organism represents the secondary consumer?

.....

**Food web:**

It is rare to find single food chains in ecosystems, because a single organism can feed on more than one source, at the same time as it is a source of nutrition for several other organisms at higher trophic levels, and the overlap and interconnection of several food chains leads to the formation of what is known as food web.

Cross-cutting concepts: cause and effect

Lack of food sources leads to an increase in competition between living organisms. which affects the numbers of individuals in biological groups.

The absence one of the organisms in a balanced ecosystem affects the rest of the food chain or food web, which leads to an imbalance in this ecological balance and perhaps its destruction.

Increase in the numbers of primary consumers leads to decrease of the number of producing organisms and qan increase in the number of secondary consumers.

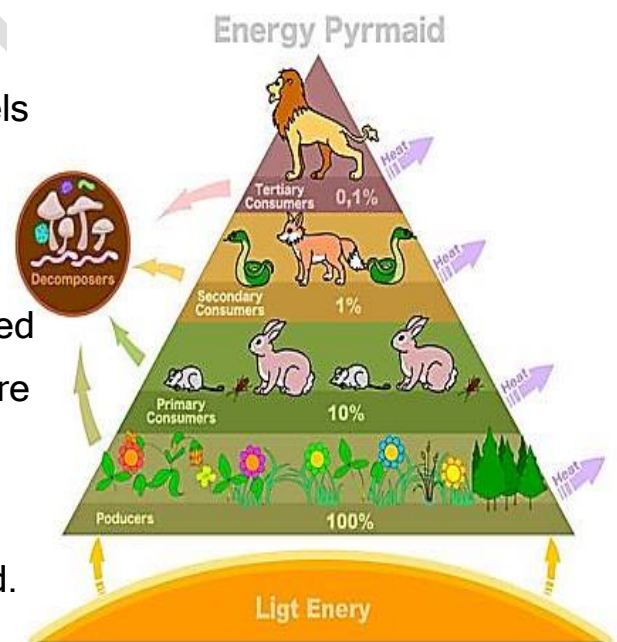
A decrease in the number of secondary consumers leads to a decrease in the numbers of tertiary consumers and increase in the number of primary consumers.

Energy pyramid:

The energy pyramid represents the path and amounts of energy between different trophic levels in any food chain.

The base of the pyramid is occupied by the producers, while the top of the pyramid is occupied by the last consumers in the food chain. The figure shows that 10% Only energy is transferred from living organisms at any level to other living organisms at the next level in the energy pyramid.

That is, only 90% of the energy is used when moving from one level to the next.



Evaluate your understanding:

How much energy reaches the third level in a food chain, if the energy of the first level in it is equal to 1000 energy units?

Questions

Choose the correct answer:

1- Which of the following food relationships causes harm to one of the two parties?

- (A) Predation and competition.
- (B) Mutual benefit and coexistence.
- (C) Mutualism and predation.
- (D) Predation and commensalism.

2 - A food chain includes an insect, a fish, a plant, and a swan. Which of these organisms is both a predator and a prey?

- (A) The insect.
- (B) The fish.
- (C) Plant.
- (D) The swan.

3- The following table represents 5 living organisms and the food of each:

living organism	food of living organism
(1)	insects, dead animals
(2)	Scorpions, reptiles, snakes, mice
(3)	weeds, seeds, berries
(4)	dead animals
(5)	Rabbit, mice, birds, squirrels

Which of the following represents a correct food chain?

- (A) Berry → (1) → (2) → (3).
- (B) Weeds → (3) → (2).
- (C) Cactus → (1) → (4).
- (D) Seeds → (4) → (2) → (5)

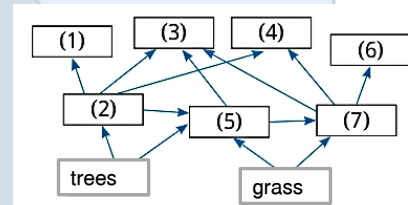
4 - Rabbits were introduced to Australia about a hundred years ago, and soon their numbers increased dramatically, producing...

- (A) Decrease in the percentage of green cover.
- (B) Increase biodiversity.
- (C) The presence of few predators.
- (D) The presence of large numbers of predators.

5- In the following food web:

Which of the following feeds on one producer organism and is fed by 3 predators?

- (A) (5) , (7)
- (B) (5), (2)
- (C) (2) , (7)
- (D) (2) , (3) , (7)



6- The organism that occupies the top of the energy pyramid in the food chain is:

- (A) The producing object
- (B) The analyzing organism
- (C) The last consumer
- (D) Primary consumer

7- A decrease in the number of secondary consumers leads to:

- (A) Decrease in the number of productive organisms
- (B) Increase in the number of primary consumers
- (C) Increase in the number of tertiary consumers.
- (D) Ecosystem stability

8- The transfer of energy in the energy pyramid from one trophic level to another is limited to:

- (A) 90% of energy
- (B) 10% of energy
- (C) 50% of energy
- (D) 100% of energy

Show causes:

1- The nutritional relationship between bees and plant flowers is a mutually beneficial relationship.

2- The feeding relationship between the Nile crocodile and the plover is not a mutually beneficial relationship.

3- The absence of one of the living organisms in a balanced ecosystem is a cause of an imbalance in the ecological balance.

4- There are often no single food chains in ecosystems.

5- Ladybugs are used in biological control instead of insecticides.

What effect does hawks have on the number of worms in a food chain consisting of grass, hawks, worms, and snakes?

What is the type of nutritional relationship between each of the following:

(1) The wolf and the rabbit.

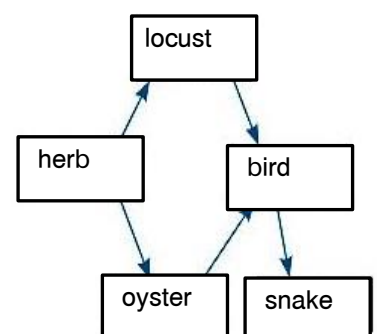
(2) Fly and *Dionaea* plant.

(3) Polar bear and seal.

In the following food web:

(1) How many food chains make up this web?

(2) Complete: To reduce the number of oysters, it is necessary to increase the number of and reduce the number of



Complete the following sentences:

- 1- An ecosystem consists of living organisms and non-living components such as: ... and ... and
- 2- The base of the energy pyramid is occupied by organisms, while the top of the pyramid is occupied by the objects
- 3- Lack of food sources leads to increased ... among living things.

Correct the mistake in the following sentences:

Energy transfer in the food chain is 90% of the energy to the next level.

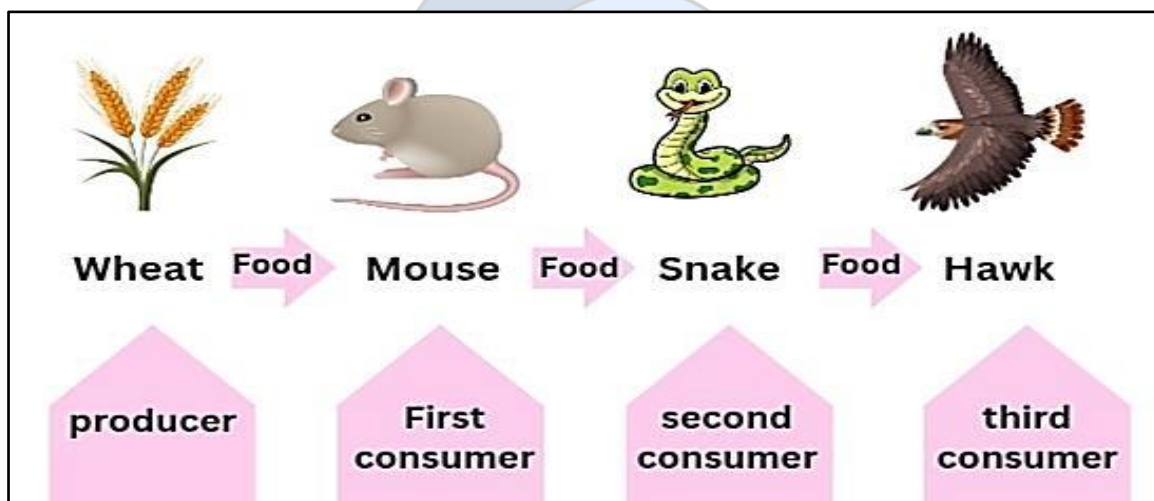
Food chains in ecosystems are limited to only producers and primary consumers.

Increased numbers of primary consumers lead to increased numbers of producers.

Arrange the following food chain:

Mouse - grass - snake - Bacteria - hawk

In the following figure, what is the effect of the absence of snakes?



(Lesson-2) Genetic Traits**Genetic and acquired traits:**

- All living organisms perform a set of vital processes, including reproduction.
- They all reproduce to produce new individuals that resemble their parents.
- The science that studies the transmission of genetic traits from parents to offspring is called with genetics.

It is clear from the above:

- There are traits that are passed from parents to without learning and are inherited from one generation to the next, such as the color of human hair, the short legs of the arctic fox, and the presence of a hard skeleton covering the body of the turtle. such traits are known by genetic traits.
- There are behaviors and skills that are passed on from parents to children without learning, such as spiders weaving webs to catch insects and chickens sitting on eggs. Such behaviors are known as behaviors Instinctive (instinct).
- There are traits that are not inherited from parents but are acquired from the surrounding environment through learning or training and are not passed on from one generation to the next. Such traits are known as acquired traits. Examples of these traits include a child learning to walk and learning languages.



Evaluate your understanding:

Classify the following into genetic traits, acquired traits, and instinctive behaviors:

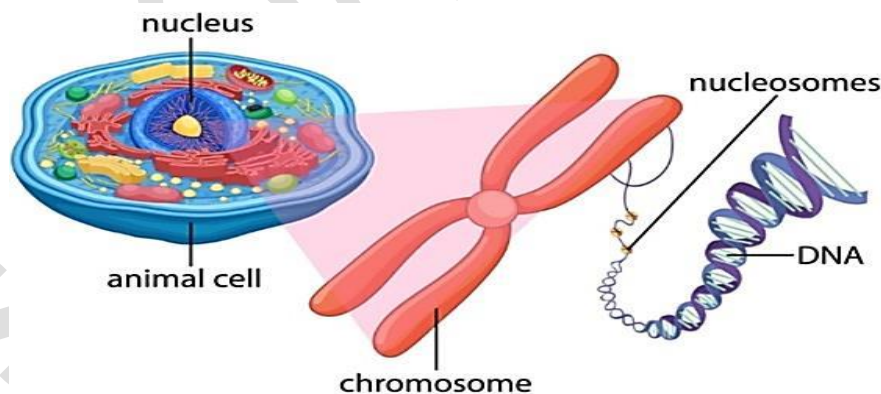
- | | |
|------------------------|------------------------------|
| 1- Reading and writing | 2- Facial freckles |
| 3- Curly hair | 4- The bird builds its nest. |
| 5- Breastfeeding | 6- Horse jumping hurdles |

Chromosomes and the transmission of genetic traits:

Genetic material is found in cytoplasm prokaryotic organisms and nuclei of eukaryotes, in the form of thread-like bodies known as Chromosomes, which are responsible for transmitting genetic traits from parents to children.

chromosome structure:

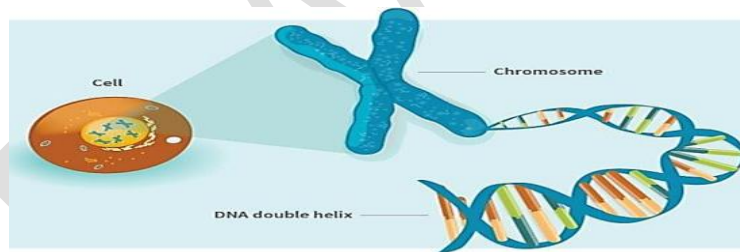
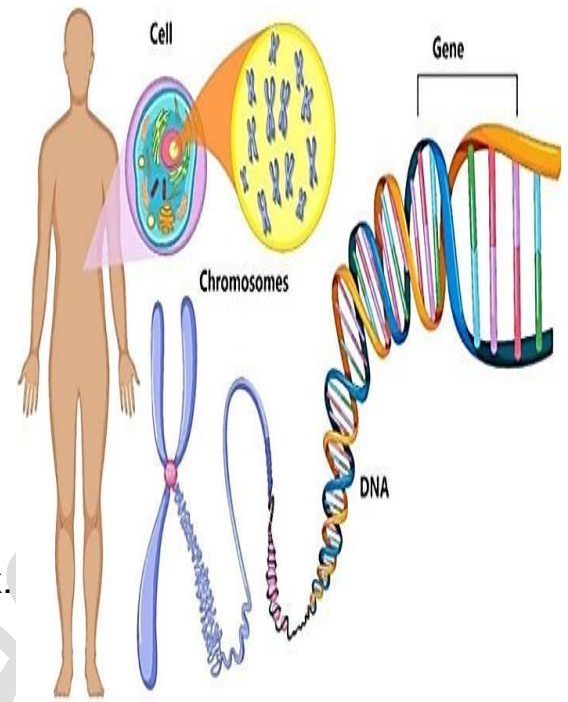
Each chromosome consists of two strands, each called a chromatid, they connect at a central point called the centromere.



Individuals of the same species agree on the number of chromosomes found in their somatic cells. such as liver and skin cells, and their number varies from one organism to another, as shown in the table.

living organism	corn plant	Bees	man
Number of chromosomes	20	32	46

- A chromosome is chemically composed of DNA wrapped around a type of protein called histones.
- DNA is made up of small parts called genes which consists of each of them is made up of a sequence of smaller building blocks called nucleotides.
- It is found in the form of two strips wrapped around each other, forming what is known as a double helix. and genes are responsible for the appearance of genetic characteristics of the living organism.
- A single chromosome carries thousands or millions of genes, the number of which varies from one chromosome to another in the cells of the same individual.



The role of genes in expressing hereditary traits:

Genetic traits are passed from parents to children through genes, with an individual inheriting half of his genetic genes from his father and the other half from his mother.

The two scientists **Beadle** and **Tatum** came up with the one-gene-one-enzyme hypothesis, which states that each gene produces a specific enzyme, and this enzyme is responsible for chemical reaction that leads to the formation of protein that shows a specific genetic trait.

Mutations:

Why do some cows look bigger compared to other cows?

What are the reasons for a person was born with a hand that had six fingers?



-A change may occur in the nature of the gene, such as a change in the order of the nucleotides that make it up.

which leads to a change in the genetic trait for which this gene is responsible.

Thus, a new trait appears that did not exist before, and this is known as a mutation.

Mutations may occur naturally, as in the birth of a black mother to an albino son.

Such mutations are known as spontaneous mutations.



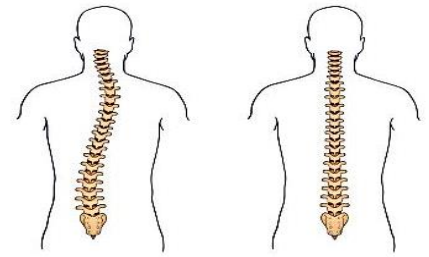
-It may occur through human intervention, as in the production of featherless chicken to save energy electricity used in air conditioning farms in free zones.

Such mutations are known as induced mutations.



Effect of mutations:

Mutations may be harmful, some may lead to death, and some may be beneficial. Harmful mutations include scoliosis, and lethal mutations result in severe muscle atrophy and weakness in some newborns.



Mutations can be beneficial whether they occur naturally or through human intervention.

One of the beneficial natural mutations is changing the skin color to match the environment, as in light skin color of people living in cold countries to help them absorb vitamin D.



Mutations that produce seedless fruits or wheat plants that are not affected by wheat rust are all beneficial mutations created by human.



Integration with agricultural science:

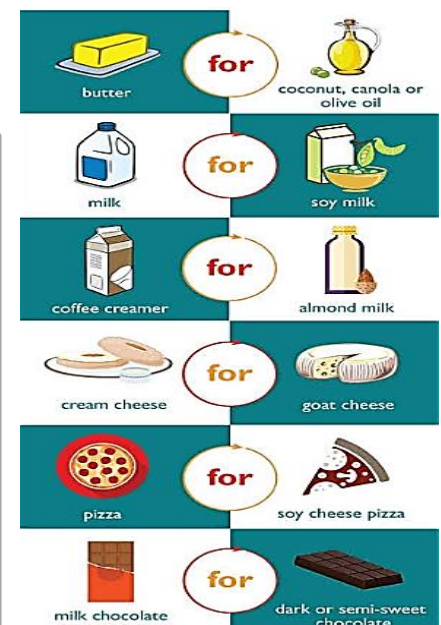
The production of cube-shaped watermelons for the purpose of facilitating their transportation is not a result of a mutation, but rather an agricultural technique, in which watermelons are placed in square molds as it grows, making it take the shape of the mold.



Life App:

*Lactose intolerance is a natural mutation that causes the lactose sugar found in milk and milk products such as cheese and yogurt to be converted into simpler sugars that are easier for the body to absorb.

*People who suffer from lactose intolerance feel cramps, nausea, and other symptoms when drinking milk or eating milk products, all of which are painful. They can avoid milk and milk products and use other products shown in the figure that do not cause these symptoms.



Complete the following sentences:

- 1- The short legs of arctic foxes are a characteristic of while the tameness of lions is a characteristic of.....
- 2- It consists of DNA is made up of small parts called each of which consists of a sequence of
- 3- Scientists Beadle and Tatum concluded that each gene is responsible for producing especially the
- 4- Genes responsible for producing an enzyme that causes a chemical reaction to occur leading to a specific genetic trait are called ...
- 5- DNA is made up of sequences of small units called
- 6- Mutations that occur in the absence of human intervention, such as a black mother giving birth to an albino son, are.....
- 7- The number of chromosomes in somatic cells is.....

Choose the correct answer:

- 1- Millions of nucleotides come together directly, forming.....

(A) Chromosomes. (B) Chromatids.
(C) Genes. (D) Histones.

- 2- Which of the following are lethal natural mutations, and which are beneficial spontaneous mutations, respectively?

(A) Children's muscular atrophy seedless grapes.
(B) Juvenile muscular dystrophy, lactose intolerance.
(C) A palm with six fingers, carrying lactose sugar.
(C) A hand with six fingers, a cube-shaped orange.

3- What is the composition of the mixture used to separate strawberry chromosomes?

- (A) Salt, dishwashing detergent and water only.
- (B) Salt, ethyl alcohol and water only.
- (C) Dishwashing detergent and ethyl alcohol only.
- (C) Salt, dishwashing detergent and ethyl alcohol.

4-The genetic characteristics of an organism appear due to:

- (A) Histones
- (B) Chromatids
- (C) Genes
- (D) nucleotides

5- An organism that has 46 chromosomes in its somatic cells is:

- (A) Human
- (B) Bees
- (C) Corn plant
- (D) Strawberries

6- Mutations resulting from human intervention are known as:

- (A) Spontaneous mutations
- (B) Natural mutations
- (C) Induced mutations
- (D) Lethal mutations

7- The reason for producing cube-shaped watermelons is:

- (A) A new mutation
- (B) Spontaneous mutation
- (C) Agricultural technology
- (D) Natural mutation

Look at the next figure and answer:

(1) What is the name given to people who have the appearance of this child?

.....

(2) What is the scientific explanation for the birth of this child with black skin?

.....



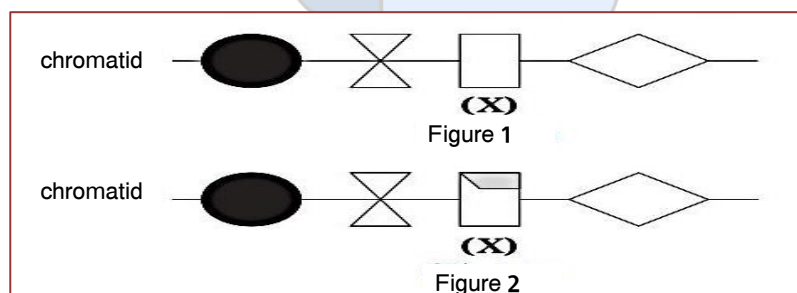
Figure (1) represents part of a chromosome in the body of a woman, and the illustration (2) represents the same chromosome in another cell in the body of the same woman.

(1) What is the name of the part (X) on the chromatid?

.....

(2) What is the name given to the change that occurs in the part (X) in Figure (2)?

.....



What is the hypothesis which was reached by the scientists Biddle and Tatum?
What does it mean?

.....

Causes:

- 1- Some cows look huge compared to other cows.
- 2- A person being born with a hand that has six fingers is an example of mutation.
- 3- People with lactose intolerance feel cramps and nausea after consuming milk.

Correct the mistake in the following sentences:

The genes responsible for the hereditary characteristics of an organism are found in histones.

.....

Induced mutations occur naturally without human intervention.

.....

The production of wheat plants resistant to wheat rust is an example of a spontaneous mutation.

.....

The production of cube-shaped watermelons is the result of a genetic mutation.

.....

Interpretive question:

Why are mutations sometimes beneficial and sometimes harmful?

.....

Unit three exam

Complete the following sentences:

- 1- Genes responsible for producing an enzyme that causes a chemical reaction to occur leading to a specific genetic trait are called
- 2- DNA is made up of sequences of small units called
- 3- Mutations that occur in the absence of human intervention, such as a black mother giving birth to an albino son, are
- 4- The number of chromosomes in somatic cells is

Correct the mistake in the following sentences:

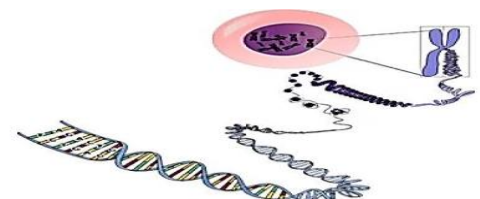
- 1- The genes responsible for the genetic characteristics of the organism are found in histones.
- 2- The newly created mutations occur naturally without human intervention.
- 3- Producing wheat plants resistant to wheat rust is an example of spontaneous mutation.
- 4- The production of cube-shaped watermelons is the result of a genetic mutation.

Causes:

- 1-The absence of one of the living organisms in a balanced ecosystem is a cause of an imbalance in the ecological balance.
- 2-There are usually no single food chains in ecosystems.

Why are mutations sometimes beneficial and sometimes harmful?

In light of the opposite figure, explain the chemical composition of the chromosome?



In light of what you have studied of the types of mutations, to which type does the mutation that produces a cube-shaped watermelon belong?

حمل الآن

مجاناً وحصرياً

المراجعة رقم (4)

اختبار شهر مارس



Worksheet on lesson (1)

Q.1) Write the scientific term :

- 1-The shortest straight path connecting between the starting point and the end point in a constant direction . (.....)
- 2-The distance covered per unit time . (.....)
- 3-The ability to do work . (.....)
- 4-The energy stored in the object as a result of the work done on it . (.....)

Q.2) Choose the correct answer :

1-What is the amount of work done by a student pushing the wall of his room with a force of 500 N ?

- a-zero b-225 J c-500 J d-1000 J

2-What is the quantity which has the same unit of measurement as force ?

- a-energy b-displacement c-speed d-weight

Q.3) Complete :

- 1-Joule = × Meter
- 2-Energy has various forms , includingand
- 3-Unit of measurement of the speed of an object isor

Q.4) State the mathematical relation that relates between :

1-Work and force

.....

2-Weight of the object and its mass

.....

3-Speed and distance.

.....



Q.5)Problems :

1-Caluculate the mass of an object if it is known to store potential energy equals 55 J at a height of 11 m . (gravitational field intensity = 10 N/kg)

.....

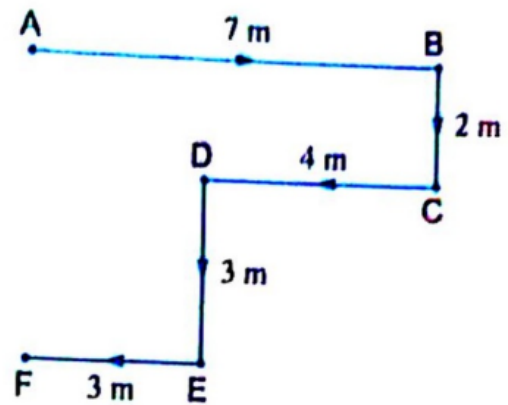
.....

2-The opposite figure illustrates

The path taken by an object from point (A) to Point (F) in a time of 3 sec

Calculate :

- 1)Total distance .
 - 2)The displacement
 - 3)The speed of the object .
-
-
-



3-Calculate the work done when a force of 1000 N is applied to move an object over 50 m in the same direction of the force.

.....

.....



Model answers of lesson (1)

Q.1) Write the scientific term :

1-Displacement	2-Speed	3-Energy	4-Potential energy
----------------	---------	----------	--------------------

Q.2) Choose the correct answer :

1-a – zero	2-d-weight
------------	------------

Q.3) Complete :

1-Newton	2-Potential energy and kinetic energy	3-m/s or km/h
----------	---------------------------------------	---------------

Q.4) State the mathematical relation that relates between :

1- $W = F \times s$

2- $W = m \times g$

3- $V = d \div t$

Q.5) Problems :

1- $W = PE \div h$
 $= 55 \div 11 = 5 \text{ N}$

$m = w \div g$
 $= 5 \div 10 = 0.5 \text{ kg}$

2-1) $d = AB + BC + CD + DE + EF$
 $= 7 + 2 + 4 + 3 + 3 = 19 \text{ m}$

2) $s = AF = BC + DE$
 $= 2 + 3 = 5 \text{ m}$

3) $v = d \div t = 19 \div 3 = 6.3 \text{ m/s}$

3- $W = F \times s$
 $= 1000 \times 50 = 50000 \text{ J}$



Worksheet
Lesson (2): kinetic energy



Q. (1) Write the scientific term:

- 1-The work done in moving an object.(.....)
- 2- A heavy tool used in demolishing old buildings as a result of the conversion of potential energy into kinetic energy (.....)
- 3- The sum of the potential and the kinetic energies of any moving object. (.....)

Q. (2) What is meant by:

- 1-The kinetic energy of an object its mass is 10 Kg equal zero.

.....

- 2- The mechanical energy of a moving object equals 500 J.

.....

Q.(3) state the mathematical relation between:

- 1-Kinetic energy of an object and its mass

.....

- 2-The mechanical energy of an object and its potential and kinetic energies

.....

Q.(4) give reason:

- 1-The work required to move a car increases as its mass increases.

- 2-The mechanical energy of an object falling from a height is constant despite the decrease in its potential energy.

3-The high dam has great importance in generating electrical energy.

.....

4-When pendulum ball passes through the original position its kinetic energy is maximum.

.....

Q.(5) variant problems:

1-An object its mass is 600 g is thrown upwards vertically at speed of 20 m/s calculate:

a)-The kinetic energy of the object at the moment of being thrown upwards.

.....

b)-The mechanical energy of the object at the maximum height it reaches.

.....

2-Caculate the speed of an object with a mass of 20kg and a kinetic energy of 250J .

.....

3-Caculate the mechanical energy of a moving object if its kinetic energy 40 J and its potential energy is 30 J .

.....

4- Calculate the maximum height reached by a stone with a mass of 2Kg given that its mechanical energy is 40 J

(gravitational field intensity =10N/KG)

.....



Model answer

Lesson (2) : kinetic energy

Q. (1) Write the scientific term:

1-Kinetic energy 2-Demolition ball (wrecking ball) 3-Mechanical energy

Q. (2) What is meant by:

1-The object is at rest (its speed is zero)

2-It means that the sum of potential and kinetic energy is 500J

Q.(3) State the mathematical relation between:

1- Kinetic energy (KE) = $\frac{1}{2}$ mass (m) \times square of speed (v)²

2- Mechanical energy (ME) = Potential energy + kinetic energy (KE)

Q. (4) Give reason:

1-Because when the mass of the car increases its kinetic energy increases so required work to move it increases.

2- Because the decrease in the potential energy equal the increase in the kinetic energy.

3- Because the potential energy of water held behind the dam is converted into kinetic energy that drives the turbines that generate electricity.

4- Because its speed is at its maximum.

Q. (5) Variant problems:

1- a) $m = \frac{600}{1000} = 0.6 \text{ kg}$

$$KE = \frac{1}{2} \times mv^2 = \frac{1}{2} \times 0.6 \times 20^2 = 120 \text{ J}$$

b) The mechanical energy at the maximum height = the kinetic energy at the moment it is thrown upwards

$$ME = KE = 120 \text{ J}$$

2-

$$v^2 = \frac{2 KE}{m}$$

$$v^2 = \frac{2 \times 250}{20} = 25 (\text{m/s})^2$$

$$v = \sqrt{v^2} = \sqrt{25} = 5 \text{ m/s}$$

3- $ME = PE + KE = 30 + 40 = 70 \text{ J}$

4- At the maximum height:

$$PE = ME = 40 \text{ J}$$

$$H = \frac{PE}{m \times g} = \frac{40}{2 \times 10} = 2 \text{ m}$$





Worksheet

Unit (3) lesson (1)



1-Write the scientific term:

1- A group of individuals of the same species living in particular at the same time.
(.....)

2-A nutritional relationship between two individuals where one of them
benefits while the other individual is harmed or loses its life.
(.....)

3- Consumers that feed on plants and animals. (.....)

4-The path of energy flow in the form of food as it moves from one living
organism to another within the ecosystem. (.....)

5-The interconnection and overlapping of multiple food chains together.
(.....)

6-A nutritional relationship between two individuals of them species for food
sources that exists in limited quantities. (.....)

2-Give reasons for:

1-the nutritional relationship between lion and zebra is considered a predation.

.....
.....

2-producers are autotrophic while consumers are heterotrophic.

.....
.....

3-The bear and the raven are from omnivorous organisms.

.....
.....

4-producers are located in the first trophic level of any food chain.

5-It's rare to find an isolated food chain in ecosystems.

3-What happens to.....?

1-Competition between two lines for food.

2-The transfer of pollen grains on the bodies of bees from one flower to another.

3- The removal of grasses from the Stratton.

4- The decrease in numbers of second consumers in food chain.

5-The increase in numbers of primary consumers in a footage chain.



Model answers

1-Write the scientific term:

1-Biotic populations

2-Predation

3-Omnivores

4-Food chain

5-Food web

6-Competition

2-Give reasons for...:

1-Because in this nutritional relationship one of them (the lion) benefits while other is harmed or loses its life (the zebra)

2-Because producers can make their own food through the Photosynthesis process while consumers depend directly or indirectly on producers to obtain their food.

3-Because both feed on plants and animals (meat)

4-Because they obtain their energy directly from the sun and they can make their own food through photosynthesis process.

5-Because it is a single organism can feed on multiple sources while this organism itself is a food source for several other organisms at higher trophic levels.

3-What happens to.....?

1-The relationship negatively impacts their growth or survival.

2-This process promotes the floral reproduction.

3-The numbers of primary consumers (herbivores) decrease, resulting in decreasing the numbers of the other consumers and disruption of the ecosystem completely.

4-This results in an increase in the numbers of the primary consumers and at decrease in the numbers of the tertiary consumers.

5-This lead to a decrease in the numbers of the producers and an increase in the numbers of the secondary consumers.

Worksheet

Unit (3) lesson (2)

A-Complete the following sentences:

- 1- The short legs of arctic foxes are a characteristic of while the tameness of lions is a characteristic of.....
- 2- DNA is made up of small parts called each consists of a sequence of
- 3- Scientists Beadle and Tatum concluded that each gene is responsible for producing especially the
- 4- Genes responsible for producing an enzyme that causes a chemical reaction to occur leading to a specific genetic trait are called
- 5- DNA is made up of sequences of small units called
- 6- Mutations that occur in the absence of human intervention, such as a black mother giving birth to an albino son, are.....
- 7- The number of chromosomes in somatic cells in man is.....

B- Choose the correct answer:

- 1- Millions of nucleotides come together directly, forming.....
(A) Chromosomes. (B) Chromatids. (C) Genes. (D) Histones.
- 2- Which of the following are lethal natural mutations, and which are beneficial spontaneous mutations, respectively?
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- 4-The genetic characteristics of an organism appear due to:
(A) Histones (B) Chromatids (C) Genes (D) nucleotides
- 5- An organism that has 46 chromosomes in its somatic cells is:
(A) Human (B) Bees (C) Corn plant (D) Strawberries



6- Mutations resulting from human intervention are known as:

- (A) Spontaneous mutations (B) Natural mutations
(C) Induced mutations (D) Lethal mutations

7- The reason for producing cube-shaped watermelons is:

- (A) A new mutation
(B) Spontaneous mutation
(C) Agricultural technology
(D) Natural mutation



C- Look at the next figure and answer:



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(2) What is the scientific explanation for the birth of this child with black skin?

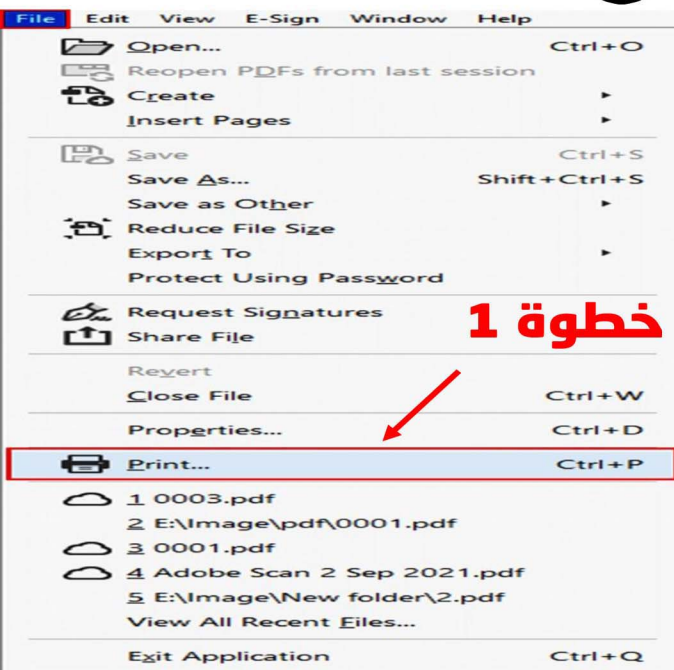
D- Correct the mistake in the following sentences:

1- The genes responsible for the hereditary characteristics of an organism are found in histones.

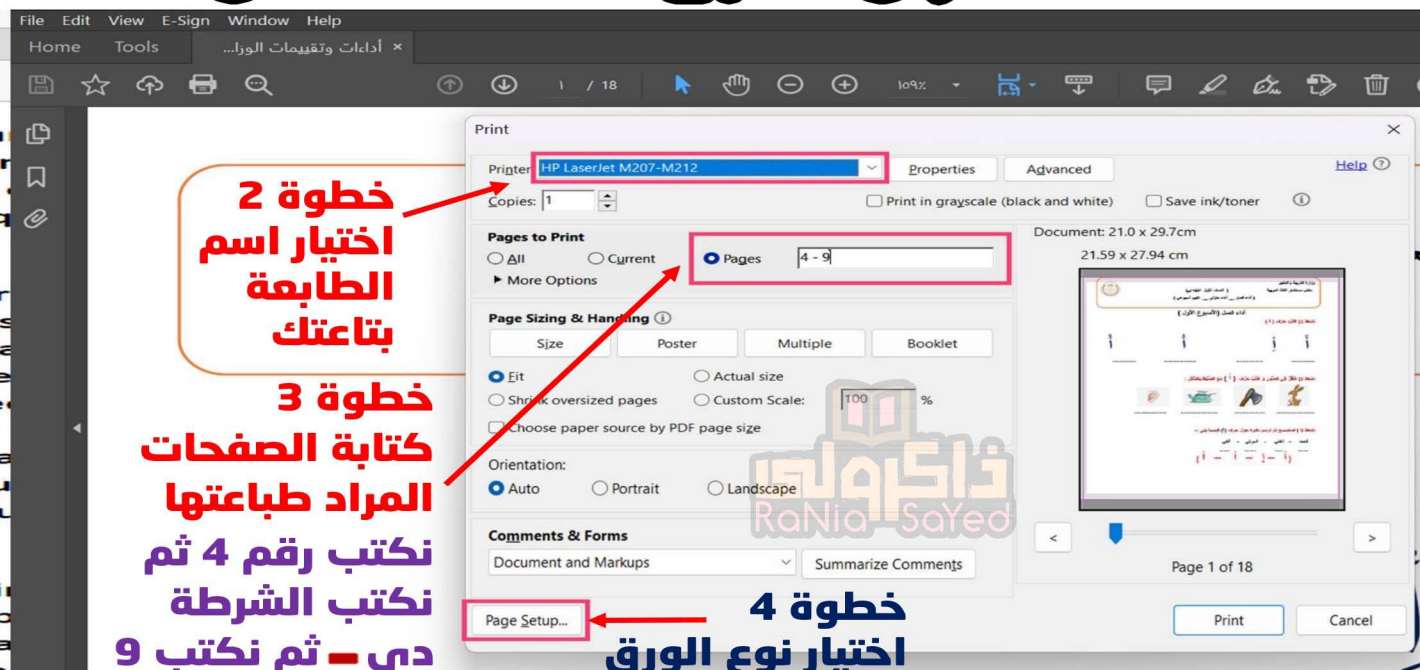
2- Induced mutations occur naturally without human intervention.

The production of wheat plants resistant to wheat rust is an example of a spontaneous mutation.

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



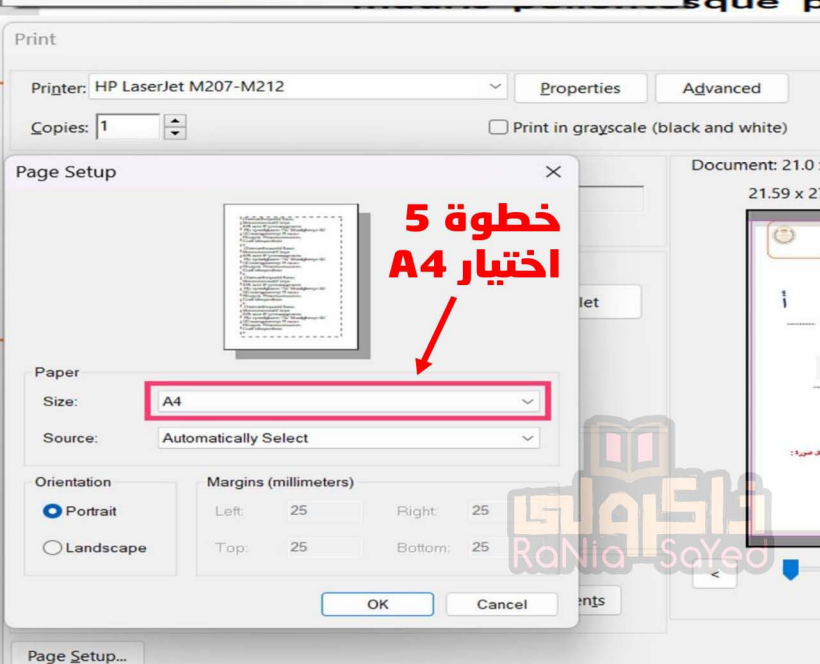
خطوة 1



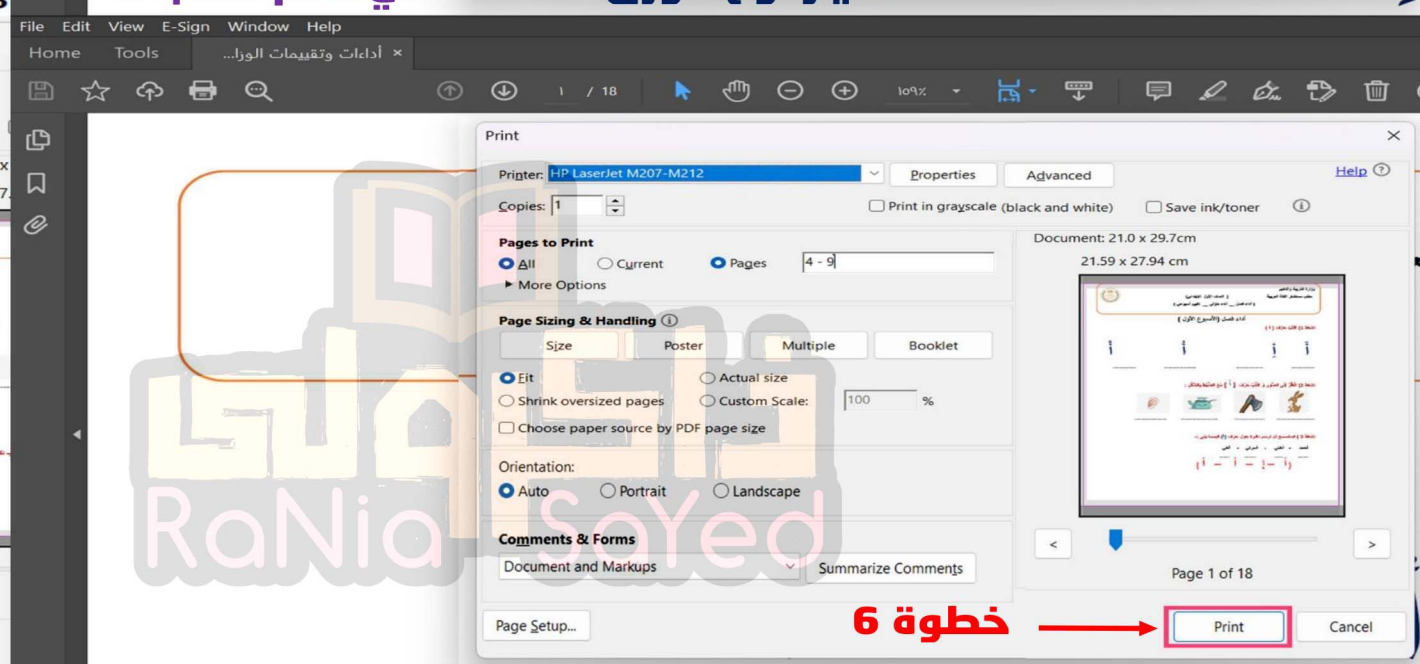
خطوة 2
اختيار اسم
الطابعة
بتاعتك

خطوة 3
كتابة الصفحات
المراد طباعتها
نكتب رقم 4 ثم
نكتب الشرطة
دي - ثم نكتب 9

خطوة 4
اختيار نوع الورق



خطوة 5
اختيار A4



خطوة 6